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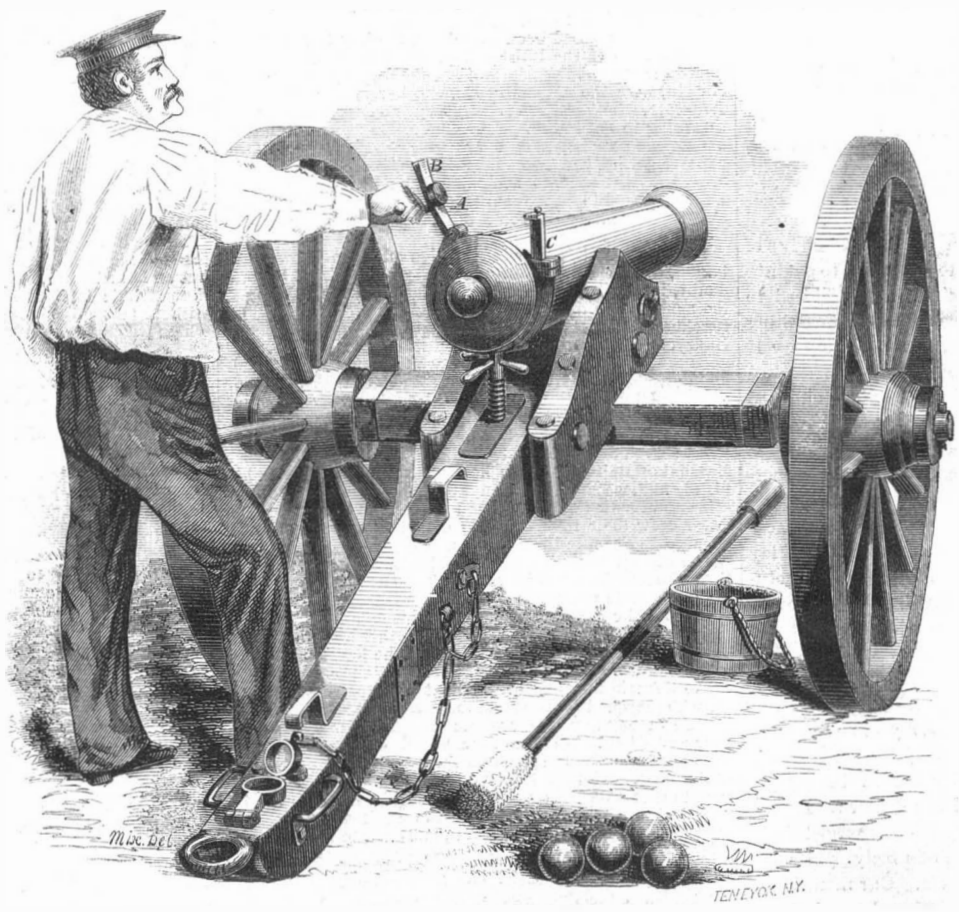
Vent Stopper for Cannon.

The most common cause of accidents with cannon is the imperfect closing of the vent in loading. When a cannon is fired, pieces of the cartridge bag are frequently left in it on fire, but the smoke soon extinguishes them; if any atmospheric air, however, gets access to them they continue to burn, and when the cartridge is run down it is kindled, causing a premature discharge, which generally blows off the gunner's arm, and is very apt to kill him. To prevent this, a man is stationed at the vent to keep it tightly closed during the process of loading, but it seems to to be almost impossible to teach men to perform this service thoroughly; hence the great number of accidents.

To secure a perfect closing of the vent in all cases is the object of the invention here illustrated. An elastic leather pad, A, is secured to the lower side of the lever, B, which is hinged to the breech of the gun in such position that, when it is turned down, the pad is brought directly over the vent. A hook or catch, C, is fixed to the gun on the side opposite the hinge, in a way to catch by a spring over the lever as the latter is turned down, and hold it securely in place with the pad pressed down upon the vent.

It would seem to be impossible for the most unskilled soldier to avoid closing the vent perfectly with this simple arrangement.

The patent for this invention was procured, through the Scientific American Patent Agency, May 28, 1861, and further information in relation to it may be had by addressing the inventor, J. J. Hirschbûhl, at Louisville, Ky.



HIRSCHBUHL'S VENT STOPPER FOR CANNON.

THE MYSTERY OF COMETS' TAILS.

There is nothing in nature more mysterious than the growth and motion of the trains of comets. When a comet is first discovered by a telescope it generally has no tail, appearing like a faint star seen through a haze. As it approaches the sun the tail is developed, starting out on the side next the sun, but being immediately turned back, as if it were a flame acted on by a powerful blast coming from the sun. The nucleus or head of the comet is matter, though lighter than the thinnest fog, but the tail is either not matter at all, or it is acted on by forces which do not manifest themselves on this earth. If the train were simply matter, acted on by gravitation, it would follow the head in its track around the sun, consequently bending, as the head sweeps around the part of its orbit nearest the sun, into nearly a semicircular curve. Instead of this, the train *always points from the sun*, swinging around as the stream of light from a lantern in the fog does when the lantern is turned. As the trains are sometimes of such length that they would reach from the sun to the earth, and as the comet when nearest the sun moves through many degrees of its orbit in a few hours, the end of the train is swept around with a velocity which forbids the belief of its being matter possessed with the property of inertia.

The velocity, too, with which the tail is shot forth is irreconcilable with the idea of its being subject to the law of inertia. The tail of the great comet of 1680, immediately after its perihelion passage, was found by Newton to have been no less than sixty millions of miles in length, and to have occupied only two days in its emission from the comet's body.

One of the most singular phenomena of comets' tails is the violent commotion observed in them. Flames stream forth from the nucleus in fan-shaped and various other and swiftly changing forms, toward the sun at first, but bending quickly back as if encountered by a furious blast, and then streaming away millions of miles into the sky. This may be owing to the intense heat to which they are exposed from their proximity to the sun. The great comet of 1843 approached the sun within about a seventh part of the sun's radius. Sir John Herschel calculates that at this distance the heat of the sun would be 47,042 times greater than it is at this earth, and at least 24½ times greater than the heat in the focus of Parker's great lens, which melted cornelian, agate and rock crystal.

Usually, as the comet moves away from the sun, the train, which it is now pushing partly before it, gradually diminishes till it disappears altogether. Sometimes, however, the train is obliterated in the vicinity of the sun, the comet emerging from the sun's light without any tail whatever. At other times the tail is the longest just after the perihelion passage; at others there are two or three or more tails branching out like a fan. They are frequently curved like Donati's in 1858, and exhibit a great variety of singular phenomena, which are an incomprehensible mystery to the students of astronomy.

At about the same time, Bissel and Prof. Pierce, each independently of the other, offered the suggestion that the trains of comets may be electricity. Perhaps they are simply light; the sun's rays, in their passage through the unknown substance of the nucleus, may acquire the power—analogous to polarization—of producing the vibrations which constitute light.

The heads of comets are unquestionably formed of material substance, as they are acted on by gravitation, and reflect the sun's light, but this substance is generally of extreme tenuity. Stars of the smallest magnitude have been seen through the densest portion of the head, and, in the language of Sir John Herschel, "The most unsubstantial clouds which float in the highest regions of our atmosphere must be looked upon as dense and massive bodies compared with the filmy and all but spiritual texture of a comet." In some, however, a very minute stellar point has been seen, indicating the existence of a solid body.

Among the mysterious phenomena presented by the head, is its diminution in size as it approaches the sun, and its rëxpansion during its retreat. It also throws off nebulous envelopes one after another, during the formation of the train, in a very curious manner.

Many of the comets move in elliptical orbits, and continue to revolve around the sun. But the orbits of a few have been ascertained to be hyperbolas, and these consequently will never return. Light, ethereal volumes of vapor, they come from unmeasured distances above, below, or on either hand, with constantly accelerating velocity, rush in strange turmoil around the sun, and then move more and more slowly away on their solitary courses into the depths of space.

THE total quantity of iron and steel of all kinds exported from Great Britain, in 1860, was 1,442,045 tuns. This does not include articles of hardware, only the unfabricated material. In the same year 778,775 cwt. of hardware were exported, valued at $15,154,014.

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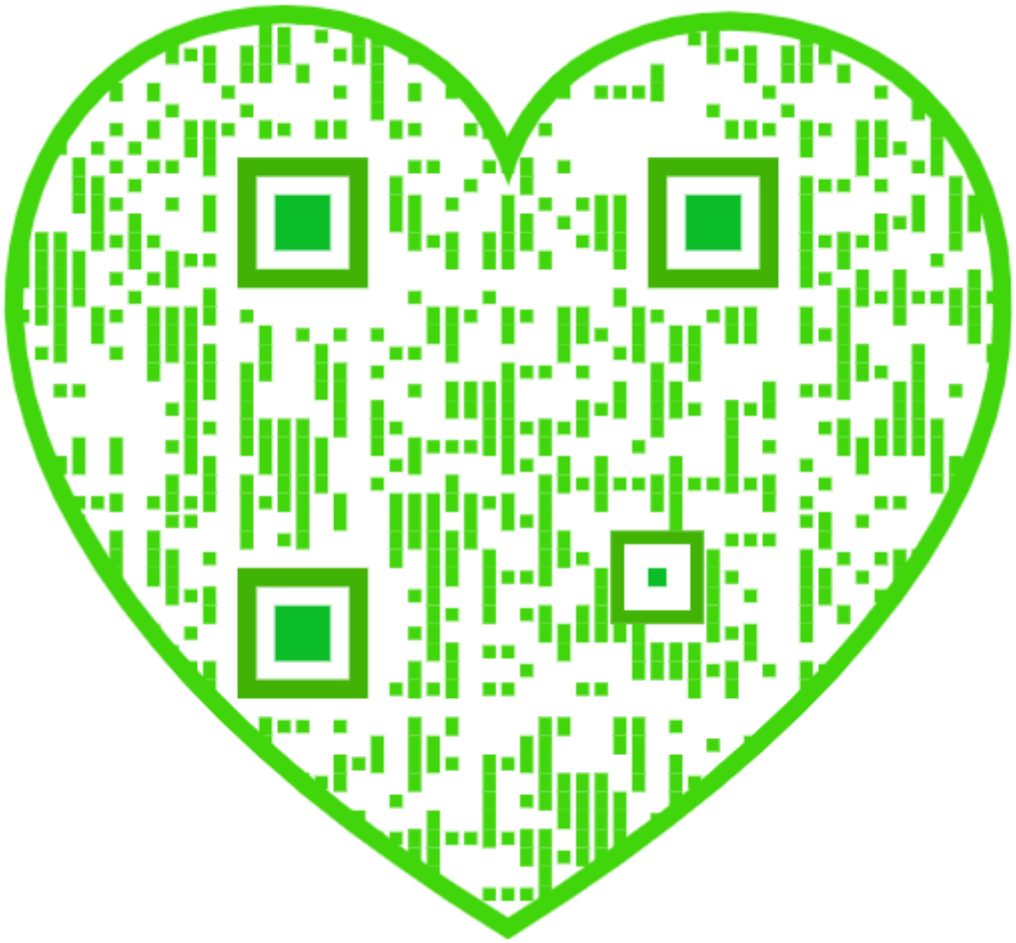

THE WAR.

GENERAL PATTERSON'S COLUMN AGAIN ACROSS THE POTOMAC.

When Gen. Cadwallader, of Gen. Patterson's command, first reached the Potomac at Williamsport, on the 16th of June, he crossed the river into Virginia, but this advance was soon recalled from some reason as yet unexplained, being the most mysterious movement that has taken place. It was also a very disastrous one for the Baltimore and Ohio Railroad, as it permitted the secessionists to return and destroy an immense amount of property belonging to this great company, including thirty-eight locomotives, several hundred freight and passenger cars, and a number of costly bridges. We have now accounts of a second crossing, which took place between 3 and 7 o'clock in the morning of Tuesday, July 2, the troops fording the river.

General Patterson had arranged for the crossing to be made at two points—one at Williamsburg, and the other a few miles below. At the latter, the guides missed the ford, and the soldiers, after entering the water, were obliged to return. But the division at Williamsport succeeded in wading through, and took up their line of march for Martinsburg, a small town thirteen miles to the south, on the line of the Baltimore and Ohio Railroad. When they arrived near Hainesville, eight miles from Williamsport, they found a rebel force, consisting, it is said, of four regiments of infantry and a company of arltilery with four rifled 6-pounders. The secessionists fired a few rounds, and then retreated. The fire was returned by our men with both cannon and small arms, and it is positively asserted that at least twenty-one of the secessionists were killed and a considerable number wounded. Our loss was three killed, nine wounded, and about forty taken prisoners.

The prisoners were not taken in the principal skirmish, but in a separate affair which occurred several miles from the main road. A body of secession troops were reported to be trying to get into our rear, and Gen. Negley's brigade was ordered to take a diverging road, about two miles from Falling Waters, to intercept them. A part of Company I, 15th regiment Pennsylvania Volunteers, was thrown out in advance, and while waiting in a piece of wood for the brigade to come up, they saw a squad of cavalry, 100 or more, belonging to the enemy, which they thought were their own men, there being no perceptible difference in uniform. They were careless, and their captain much to blame for allowing them to be entirely off their guard, so much so as to lay their arms on the ground, while some of them actually let down the fence for the cavalry to pass over. Our men did not discover their mistake until the dastard villain who commanded the troopers shot down the man who let the fence down for him? This man is Bob Swan, a Marylander, who murdered Spring at Cumberland eight or ten years ago. Our men were completely taken by surprise, and sprung to their guns, while the cavalry dashed in among them. Forty men were cut off from their arms and made prisoners; the rest of our men discharged their muskets and fell back upon the main body, while the troopers hurried off their prisoners. Our men, however, emptied three saddles and captured two horses. One of the troopers was killed; the others were lifted in front of the riders and carried off. This occurred quite early in the day, and they carried their prisoners through Martinsburg in advance of the retreating rebel troops. Our men were tied with their hands behind, in couples. Some of the citizens gave them food. They were greatly distressed by the forced march they had made.

The column continued to advance, driving the secessionists before it, till it reached Martinsburg, where it was encamped at last accounts, waiting for reinforcements. These are on the way, sufficient, it is said, to swell the force to 35,000 men.

UNION MOVEMENTS AT THE SOUTH.

The loyal citizens of East Tennessee have followed the example of those of Western Virginia, and have organized an opposition to the secessionists in their State. They recently met in convention and put forth an address, in which the conspirators against the government are handled in a most vigorous manner. They show conclusively that having no good ground for their movement, the secession leaders have been compelled to resort to systematic deception in order to gain the ear of the people. There are also reports of a similar movement in Texas. The goverment organized by the loyal inhabitants of Virginia has been recognized by the United States government, and two United States Senators have been appointed to represent the State in Congress.

MEETING OF CONGRESS.

On the 4th of July, the eighty-fifth anniversary of the Declaration of Independence, the Congress of the United States assembled in extra session, to provide means for suppressing by far the most formidable rebellion that has ever been raised against our government. The President's Message was quite short, recommending that 400,000 men and $400,000,000 be provided for carrying on the war. The reports of the heads of departments are noticed in another place.

CAPTURE OF CAPTAIN THOMAS WHO SEIZED THE "SAINT NICHOLAS."

In our last we gave a brief account of the seizure of the *St. Nicholas* steamboat on Chesapeake Bay. It seems that the leader of that piratical operation was a certain Capt. Thomas, of Maryland, who went on board disguised as a French lady. In the Baltimore *American*, of July 9th, we find the following account of the arrest of this nice gentleman:—

Lieutenant Thomas H. Carmichael of the Middle District Police, and Mr. John Horner, of this city, captured yesterday afternoon no less an important personage than Capt. Thomas of St. Mary's County, alias the "French Lady," whose exploit in seizing the steamer *St. Nicholas* a short time since, while in the Patuxent river, was so boastingly proclaimed by the secession journals of this city as a "brilliant exploit."

These officers had been sent down the bay to arrest one of the rioters of the 19th of April, and on their return on board the steamboat, *Mary Washington*, they found Capt. Kirwin, with the engineer and another officer of the *St. Nicholas*, who had been released by the captors and were returning to Baltimore. The officers also ascertained that among the passengers on board were seven or eight of the captors, with Capt. Thomas himself, who, doubtless, exhilarated by the success attending their first achievement, were disposed to make another venture, probably on the steamer *Columbia* or some other steamer plying on the Maryland rivers.

As soon as satisfactory information on this point was obtained, and each one of the party recognized beyond doubt, Lieut. Carmichael directed Capt. Masons L. Weems, the commander of the *Mary Washington*, to proceed, on reaching the harbor, to land the passengers at Fort McHenry. The direction was given while the steamer was near Annapolis. Shortly after, while Lieut. Carmichael and Mr. Horner were in the ladies' cabin, they were approached by Thomas, who desired to know by what authority the order had been given to the steamer to touch at Fort McHenry. The lieutenant informed him that it was through authority vested in him by Col. Kenly, Provost Marshal of Baltimore. On hearing this, Thomas drew his pistol, and, calling his men around him, threatened to seize and throw Carmichael and Horner overboard. The latter drew their revolvers and defied the other party to proceed to execute their threats.

The utmost confusion prevailed in the cabin for a short time, the female passengers running out screaming, but the other male passengers stood up with Carmichael and Horner, and compelled Thomas and his companions to remain quiet. Matters thus stood on the boat until the steamer touched the fort wharf, when the lieutenant went up and informed Gen. Banks of his important capture.

The General instantly ordered out a company of infantry, who marched to the steamboat and secured all the accused except Thomas, for whom search was made for an hour and a half. He was then found concealed in the drawer of a bureau in the ladies' cabin, in the after part of the boat. At first it was apprehended that Thomas would make a desperate resistance, but he disclaimed any such design, alleging that he was too weak to resist. He and the other prisoners were then marched to the fort and placed in confinement.

This capture has caused the greatest excitement in Baltimore, where Thomas is well known.

THE PRESENT SITUATION.

General Lyon, at last accounts, was pursuing Gov. Jackson, of Missouri, toward the southwest corner of that State; and secessionism seems to be almost completely overthrown in Missouri. Gen. Prentiss is securely intrenched at Cairo, Ill., and has reinforced the detachment at Bird's Point, on the opposite side of the Mississippi, in Missouri. At Cincinnati, a number of gunboats are being built to accompany the army down the Mississippi in the autumn. In Virginia, along its northern boundary, are four armies—Gen. McClellan's in the west, Gen. Patterson's at Martinsburg, Gen. McDowell's intrenched south of Washington, and Gen. Butler's at Fortress Monroe.

THE GRAND ADVANCE.

There is now a general anticipation of an early advance southward of all the armies except Gen. Butler's; and perhaps by that also. It is supposed that our heavy columns will move steadily through the State, sweeping the secessionists out of the Old Dominion, and restoring protection to the loyal inhabitants.

CONGRESS — THE PRESIDENT'S MESSAGE — REPORTS OF THE SECRETARIES OF THE TREASURY, WAR AND NAVY.

PRESIDENT'S MESSAGE.

Since our last issue, Congress has assembled in extraordinary session, and the President and Secretaries have furnished to that body interesting details of the state of the country. The President's Message is a plain, unpretending document, without ornament or flourish, and, as reported by telegraph, is somewhat marred in its grammatical character. After reviewing the rise and progress of secession, the President says:

It is now recommended that you give the legal means for making this contest a short and decisive one; that you place at the control of the government for the work at least 400,000 men and $400,000,000; that number of men is about one-tenth of those of proper ages within the regions where apparently all are willing to engage, and the sum is less than a twenty-third part of the money value owned by the men who seem ready to devote the whole.

A debt of six hundred millions of dollars now is a less sum per head than was the debt of our revolution when we came out of that struggle, and the money value in the country bears even a greater proportion to what it was then than does the population. Surely each man has as strong a motive now to preserve our liberties, as each had then to establish them.

A right result at this time will be worth more to the world than ten times the men and ten times the money.

The evidence reaching us from the country leaves no doubt that the material for the work is abundant, and that it needs only the hand of legislation to give it legal sanction, and the hand of the Executive to give it practical shape and efficiency.

One of the greatest perplexities of the government is to avoid receiving troops faster than it can provide for them. In a word, the people will save their government, if the government itself will do its part only indifferently well.

He pays the following extraordinary compliment to the soldiers and sailors:—

It is worthy of note that, while in this, the government's hour of trial, large numbers of those in the army and navy who have been favored with offices have resigned and proved false to the hand which pampered them, not one common soldier or common sailor is known to have deserted his flag. Great honor is due to those officers who remained true, despite the example of their treacherous associates; but the greatest honor, and the most important fact of all, is the unanimous firmness of the common soilders and common sailors.

To the last man, so far as known, they have successfully resisted the traitorous efforts of those whose commands, but an hour before, they obeyed as absolute law. This is the patriotic instinct of plain people. They understand, without an argument, that the destroying the government which was made by Washington, means no good to them.

REPORT OF THE SECRETARY OF THE TREASURY.

The Secretary of the Treasury carefully looks over the debit and credit side of the great controversy for the maintenance of our government, and sums up as follows:—

For civil list, foreign intercourse and miscellaneous objects, $831,496,90; for the Interior Department, $431,525,-75; for the War Department, $180,296,397 19; for the Navy Department, $30,609,520 29; in the aggregate, $217,168,-850 15. In addition to these demands upon the treasury, it will be necessary to provide for the redemption of the treasury notes due and maturing, to the amount of $12,-639,861 64, and for the payment of the interest on the public debt to be created during the year, which, computed for the average of the six months, may be estimated at $9,000-000.

After further figuring, the Secretary says the whole amount required for the fiscal year of 1862 may therefore be stated at $318,519,581 77. He is of opinion that $80,-000,000 should be raised by taxation, and that $240,000,-000 should be sought through loans.

The value of the real and personal property of the people of the United States, according to the census of 1860, is $16,102,924,116, or, omitting fractions, of sixteen thousand millions of dollars.

The value of the real property is estimated at $11,272,-053,881, and the value of personal property at $4,830,880,-235. The proportion of the property of both descriptions in the United States, excluding those at present under insurrection, is $10,900,758,009, of which sum $7,630,530,603 represents, according to the best estimates, the value of the real, and $3,270,227,404 the value of the personal property. A rate of one-eight of one per cent *advalorem*, on the whole real and personal property of the country, would produce a sum of $20,128,667. A rate of one-fifth of one per cent on the real and personal property of the States not under insurrection would produce the sum of $21,800,056, at a rate of three-tenths of one per cent on real property alone in these States would produce $22,891,-590—either sum being largely in excess of the amount required.

The Secretary proposes to Congress that a duty of 2½ cents per pound be laid on brown sugar, of 3 cents per pound on clayed sugar, of 4 cents per pound on loaf and other refined sugars, of 2½ cents per pound on the sirup of sugar cane; of 6 cents per pound on candy; of 6 cents per gallon on molasses, and of 4 cents per gallon on sour molasses; and it is also proposed that a duty of 5 cents per pound be imposed on coffee; 15 cents per pound on black tea, and 20 cents per pound on green tea. From these duties it is estimated that an additional revenue of not less than $20,000,000 annually may be raised.

REPORT OF THE SECRETARY OF WAR.

The Secretary of War brings out the details of the grand Union army, and discusses the subject in a vigorous manner. He says:—

The conspirators against the government left nothing undone to perpetuate the memory of their infamy. Revenue steamers have been deliberately betrayed by their

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commanders, or, where treason could not be brought to consummate the defection, have been overpowered by rebel troops at the command of disloyal Governors. The government arsenals at Little Rock, Baton Rouge, Mount Vernon, Apalachicola, Augusta, Charleston and Fayetteville; the ordnance depot at San Antonio, and all the other government works in Texas, which served as the depots of immense stores of arms and ammunition, have been surrendered by the commander or seized by disloyal hands. Forts Macon, Caswell, Johnson, Clinch, Pulaski, Jackson, Marion, Barrancas, McKee, Morgan, Gaines, Pike, Macomb, St. Phillip, Livingston, Smith, and three at Charleston; Oglethorpe barracks, Barrancas barracks, New Orleans barracks, Fort Jackson, on the Mississippi; the battery at Bienvenue, Dupre, and the works at Ship Island, have been successively stolen from the government or betrayed by their commaneing officers. The Custom Houses at New Orleans, Mobile, Savannah, Charleston, and other important points, containing vast amounts of government funds, were treacherously appropriated to sustain the cause of rebellion. In like manner the Branch Mint at New Orleans, at Charlotte and at Dahlonega, have been illegally seized, in defiance of every principle of common honesty and honor. The violent seizure of the United States Marine Hospital at New Orleans was only wanting to complete the catalogue of crime. The inmates, who had been disabled by devotion to their country's service, and who there had been secured a grateful asylum, were cruelly ordered to be removed, without the slightest provision being made for their support or comfort. In Texas, the large force detailed for protection of the inhabitants against the attack of marauding Indians, were ignominiously deserted by their commander, Brig.-General Twiggs. To the infamy of treason to his flag was added the crowning crime of deliberately handing over to the armed enemies of his government all the public property entrusted to his charge, thus even depriving the loyal men under his command of all means of transportation out of the State.

The total force now in the field may be computed as follows:—

Regulars and volunteers for three months and for the war	225,000
Add to this fifty-five regiments of volunteers for for the war, accepted, and not yet in service	50,000
Add new regiments of regular army	25,000—75,000
Total force now at command of government	310,000
Deduct three months' volunteers	80,000
Force for service after the withdrawal of the three months' men	230,000

It will be perceived that after the discharge of the three months' troops, there will be still an available force of volunteers amounting to 188,000, which, added to the regular army, will constitute a force of 230,000 officers and men. It will be for Congress to determine whether this army shall, at this time, be increased by the addition of a still larger volunteer force.

The report of the Chiefs of the different Bureaus of this department, which are herewith submitted, present the estimates of the probable amount of appropriations required, in addition to those already made for the year ending June 30, 1861, for the force now in the field, or which has been accepted, and will be in service within the next twenty days, as follows:—

Quartermaster's Department	$70,289,200 21
Subsistence Department	27,278,731 50
Ordnance Department	7,458,172 00
Pay Department	67 815,403 48
Adjutant-General's Department	408,000 00
Engineer Department	685.000 00
Topographical Engineer Department	60,000 00
Surgeon-General's Department	1,271,841 00
Due States which have made advances for troops	10,000,000 00
Total	$185,296,397 19

The Secretary adds:—

The calling forth of this large and admiraole force, in vindication of the constitution and the laws, is in strict accordance with a wise prudence and economy, and, at the same time, in perfect harmony with the uniform practice of the government. But three years ago, when the authority of the nation was contemptuously defied by the Mormons in Utah, the only safe policy considered consistent with the dignity of the government was the prompt employment of such an overwhelming force for the suppression of the rebellion as removed all possibility of failure. It will hardly be credited, however, that the following language in relation to that period was penned by John B. Floyd, then Secretary of War, and now actively engaged in leading the rebel forces, who have even less to justify their action than the Mormons:—

When a small force was sent to Utah, the Mormons attacked and destroyed their trains, and made ready for a general attack upon their column. When a sufficient power was put on foot to put success beyond all doubt, their bluster and bravado sank into whispers of terror and submission. This movement upon that territory was demanded by the moral sentiment of the country, was due to a vindication of its laws and constitution, and was essential to demonstrate the power of the Federal government to chastise insubordination and quell rebellion, however formidable from numbers or position it may seem to be. Adequate preparations and a prompt advance of the army was an act of mercy and humanity to these deluded people, for it prevented the effusion of blood.

I recommend the same vigorous and merciful policy now.

THE REPORT OF THE SECRETARY OF THE NAVY

Furnishes some very important facts respecting the past and present condition of the navy.

On the 4th of March last, of 69 vessels in the navy, only 42 were in commission, carrying but 555 guns, and these vessels were scattered on every sea,—most of them on foreigns stations. The home squadron consisted of only 12 vessels, carrying 187 guns, and but four small vessels, carrying 25 guns, were in northern ports. Demoralization prevailed among the officers, and no less than 259 of them have resigned their commissions or have been dismissed the service, for betrayal of trust. To the credit of the common seamen, while so many officers have proved unfaithful, their crews have been true, and have maintained their devotion to the Union under all trials and circumstances.

The faithful officers, engineers, carpenters, seamen and marines of the navy, have exhibited an energy and activity unparalleled. In the course of three months, a powerful navy has been raised from the vessels that had been dismantled, and new vessels purchased and engaged for the contest.

INCREASE OF THE NAVY.

There have been recently added to the navy, by purchase, twelve steamers, carrying from two to nine guns each, and three sailing vessels. There have been chartered nine steamers, carrying from two to nine guns each. By these additions the naval force in commission has been increased to eighty-two vessels, carrying upward of 1,100 guns, and with a complement of about 13,000 men, exclusive of officers and marines. There are also several steamboats and other small craft which are temporarily in the service of the department.

The squadron on the Atlantic coast, under the command of Flag Officer S. H. Stringham, consists of twenty-two vessels, 296 guns and 3,300 men.

The squadron in the Gulf, under the command of Flag Officer William Mervine, consists of twenty-one vessels, 282 guns and 3,500 men.

Additions have been made to each of the squadrons, of two or three small vessels that have been captured and taken into the service. The steamers Pawnee and Pocahontas, and the flotilla under the late Commander Ward, with several steamboats in charge of naval officers, have been employed on the Potomac river, to prevent communication with that portion of Virginia which is in insurrection. Great service has been rendered by this armed force, which has been vigilant in intercepting supplies, and in protecting transport and supply-vessels in their passage up and down the Potomac.

The squadron in the Pacific, under the command of Flag-Officer John B. Montgomery, consists of six vessels, 82 guns and 1,000 men.

The West India squadron is under the command of Flag-Officer G. J. Pendergrast, who has been temporarily on duty with his flag-ship, the Cumberland, at Norfolk and Hampton Roads, since the 23d of March. He will, at an early day, transfer his flag to the steam frigate Roanoke, and proceed southward, having in charge our interests on the Mexican and Central American Coasts, and in the West India islands.

The East India, Mediterranean, Brazil and African squadrons, excepting one vessel of each of the two latter, have been recalled.

The return of these vessels will add to the force for service in the Gulf and on the Atlantic coast about 200 guns and 2,500 men.

The places of the secession officers have been mostly supplied by patriotic officers who had retired to the pursuits of peace, but who, when their country required their services, came forward and made a voluntary tender of them, to support the government.

IRON-CLAD STEAMERS.

Respecting the building of new vessels of this character, the Secretary of the Navy says:—

Much attention has been given within the last two years to the subject of floating batteries or iron-clad steamers. Other governments, and particularly France and England, have made it a special object in connection with naval improvements; and the ingenuity and inventive faculties of our own countrymen have also been stimulated by recent occurrences toward the construction of this class of vessels. The period is perhaps not one best adapted to heavy expenditures by way of experiment and the time and attention of some of those who are most competent to investigate and form correct conclusions on this subject are otherwise employed. I would, however, recommend the appointment of a proper and competent board to inquire into and report in regard to a measure so important; and it is for Congress to decide whether, on a favorable report, they will order one or more iron-clad steamers, or floating batteries, to be constructed, with a a view to perfect protection from the effects of present ordnance at short range, and make an appropriation for that purpose.

STEAM GUN-BOATS.

The report states that for immediate, urgent service, transport steamers were secured to act as sentinels, mounting small batteries. As these vessels will not answer for coast service during the stormy winter months, the necessity of building new and strong gun-boats of light draft was urged, hence 23 new steam gun-boats, each 500 tuns burden, have been contracted for.

The burning of the Norfolk Navy Yard is apologized for as a measure of necessity, and yet it appears to us that it was a calamity which by energetic measures could have been prevented, and the property saved. It is, however, gratifying to know that the navy is now in such a state of efficiency, and that it is capable of blockading the whole coast in a very effectual manner. Large quantities of arms, which had been purchased in Europe and shipped for New Orleans, have been prevented from reaching their destination by the activity of the blockading squadron in the Gulf.

RECENT AMERICAN INVENTIONS.

Melodeons, &c.—The object of this invention is to enable players of little experience to play in different keys; and to this end the invention consists in a movable key-board, so applied and combined with the reeds, or their equivalents, that by the aid of a fixed scale in front of the key-board, it may be set to play in any desired key. Wm. F. Sheldon, of East Mendon, N. Y., is the inventor.

Boilers.—This invention consists in a certain novel arrangement of a superheating vessel, and feed water heating vessel, in combination with each other, and within the smoke box and chimney base, at the rear end of a horizontal multitubular boiler, whereby the heat of the escaping gases of combustion is utilized and the draft through the upper and lower tubes of flues of the boiler is rendered uniform or nearly so. The patentee of this ingenious device is Francis B. Blanchard, of Brooklyn, N. Y.

Statistics of British Cities.

The new census of Great Britain was taken last spring, and some statistics of the leading cities have already been published.

The total population of England and Wales is 20,205,504, being an increase of 2,169,576 during the past ten years. With Scotland, estimated at 3,200,574, the total population of Great Britain is now nearly twenty-three and a half millions, which, with the population of Ireland of six and a half millions, will give the United Kingdom a population of thirty millions. The emigration from the United Kingdom to different parts of the world during ten years has been 2,249,355.

The population of London is now no less than 2,803,034, an increase of 440,798 since 1851. It is the largest city in the world, and is growing with a rapidity that is perfectly astonishing.

Liverpool, which is the chief seat of American trade with England, had a population of 375,955 in 1851; it has now 430,000 inhabitants.

Manchester, the great cotton city of the world, had a population of 317,000 in 1851; it is now 357,000—this includes the suburbs.

Glasgow, the chief engineering city of Great Britain, had a population of 360,138 in 1851; it is now 446,395, including the suburbs. It is the second city in Great Britain.

GREAT RIVER.—Admiral Hope, of the British navy, has succeeded in ascending the great river of China, Yang-tse, to a distance of 570 nautical miles from its mouth, without any accident, and it was stated that it was navigable for 157 miles further up, making in all 727 miles, or about 842 statute miles from the sea. The Yang-tse, therefore, although it be in point of navigation neither the Mississippi nor the St. Lawrence, far excels the Ganges, the Rhine and the Danube; it is, indeed, the finest navigable river of the Old World.

PATENT COMMITTEES.—The following have been appointed on the Patent Committees of the Senate and House of Representatives:—

SENATE—Simmons, of R. I.; Sumner, of Mass.; Cowan, of Pa.; Thomson, of N. J.; Saulsbury, of Md.

HOUSE—Dunn, of Ind.; Rice, of Maine; Baker, of N. Y.; Johnson, of Pa.; Noble, of Ohio.

IN the British colonies there were no less than 647 sailing ships—all wood—built in 1860, also three timber steamships, and one of iron. Nearly as many sailing ships are now built in the British colonies as in the Kingdom of Great Britain.

The Herald says that the steam gunboats which the government have contracted for will be completed and ready for sea in about six months. The aggregate armament and force of these vessels will be as follows:—

Officers and men	8,000
32-pound cannon	480
10-inch guns	40
Rifled cannon	40

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Manufacture of Hollow Iron Ware.

Our English cotemporary, *The Ironmonger*, gives a description of Dartmouth Works, Birmingham, carried on by Mr. David Jones, from which we condense the following :

The manufacturer of wrought iron hollow-wares procures the bars or rods and plates or sheets which he wants, from the iron-master. The first operation is to cut the wrought iron plates or sheets into the required shapes ; this is done with huge bench-shears, which are worked simply by hand ; they are made of the best-tempered steel, and are apparently so little affected by the hard wear and tear of the edges in cutting through endless successions of tolerably stout iron plates, that they want sharpening only once every three months. The disks for rice-bowls, sugar-bowls, tops and bottoms for iron casks, &c., are cut to shape by circular shears, which can be set to any guage required. Frying-pans, bowls, and a variety of other articles are stamped in dies. In Mr. Jones' establishment there are five stamping machines in active operation ; three of these are of the usual kind, whilst the other two are, to all intents and purposes, steam-hammers, upon Nasmyth's principle. The first step in the manufacture of frying-pans is, to heat the plate to redness, and then to place it in that condition on the lower or bed die of the first of three stamping machines, standing side by side in a row ; the hammer or drop, which bears the upper or counter die, is then released, by drawing forward the trigger or lever, and let fall upon the lower die, on which the disked plate lies. As the drop falls from a considerable elevation, the violence of the blow makes it recoil and bound upwards some distance ; the drop or recoiling is caught by a pair of pall levers, locked in racks fixed on the sides of the upright standards of the machine. The shallow pen is now rapidly shifted, by means of tongs, from the first to the second machine, and stamp again, to bring it nearer the required depth ; from the second machine it is then again shifted, in the same way, to the third, where it receives the final blow of the stamp. To mere superficial observation the pan looks now as if it required only paring the rough edges, and putting on the handle, to make it fit for use. This is, however, very far from being the case ; on the contrary, it is only now that the work begins. Violent concussion tends to impair the toughness of wrought iron, and to change the fibrous structure back to the original crystalline and brittle structure of cast iron. Now, this result is produced in the wrought iron disk, by the powerful blows of stamping machines ; to correct this and restore the iron to its proper condition, and also prepare it for the subsequent operation of tinning, the pan is re-annealed, and then subject to a systematic process of hammering, in which the hammer is made to fall with the greatest possible uniformity upon one spot, the pan being moved about beneath it until every part of it, from the center to the edge, has passed under the face of the hammer. When this has been fully accomplished, the rough edge or rim is properly pared, and the pan thoroughly scraped with an appropriate iron tool, to remove every scale of oxyde. It is then hammered once more, and after this taken to the mounting-shop, where the handle, forged out of a wrought-iron bar or rod, is firmly riveted on. A great many attempts have of late been made at simplifying the manufacture of frying-pans by introducing the aid of machinery, but hitherto without success.

The rice-bowls, sugar-bowls, &c., are stamped as already stated, under the steam-hammer. It is constructed somewhat after the fashion of the ordinary stamping machine, with upright planed standards, which serve as guides. The drop or hammer-block is connected with a piston-rod coming out at the bottom of a cylinder in which the piston works. High-pressure steam is let in over the piston, which raises it, together with the hammer attached to it, to any required hight within its vertical range of motion between the two planed guides. When the valve of the cylinder is opened the steam escapes, and the hammer, with the upper die attached to it, falls on the disked plates that lie on the lower die, dipping with unerring precision into the central parts, and converting the flat plate into a bowl of greater or less depth. The force with which the hammer is to descend may be measured to a nicety, by simply regulating the escape of the steam from the cylinder. The deep rice-bowls require several stampings with different dies before the full depth is attained, after which they pass the same processes of annealing and hammering as frying pans.

The stamped tops and bottoms for casks, kegs, buckets, corn-bins, &c., are taken to another department of the works, where they are properly joined in various ways, by seaming, soldering, riveting, to the body and the other parts of the vessel to which they belong ; thus for instance, the bottom of a bucket is seamed on, and the hoop then driven on to it. The heads of large casks for shipping cements, white-lead, oils, &c., are generally secured with screw-pins. Iron kegs and casks are now in extensive demand both for fluids and dry goods, as they present decided advantages over wooden-casks, being much more durable and secure.

In the brazier's department are made tea-kettles, saucepans, and other culinary utensils, sugar-boilers for the West Indies, and a variety of other articles too numerous to mention. The spouts of brass tea-kettles are made to assume the curved form in which we see them in the finished article, by filling the straight tube with molten metal, which is poured in at one end, the other end being stopped up with a paper plug, and when the metal has become solid, hammering the spout into the required shape, after which it is placed in the fire to get out the fusible metal. The process of soldering is conducted pretty nearly in the same way as for brass articles.

Some of the articles made of wrought iron, such as kegs, casks, corn-bins, bushel measures, &c., are painted, generally blue or green, or brown, with black hoops, &c. The painting shop contains a large drying stove, heated by steam supplied from the boiler, in which the painted articles are dried.

Frying-pans, bowls, and a variety of other articles, are coated over with tin, to protect them from oxydation.

Tin has a silvery white color, inclining slightly to yellow. It constitutes an important element in many alloys, imparting hardnesss, whiteness, and fusibility to them. It is the basis and principal component of the several varieties of pewter ; also of Britannia metal. The better sorts of pewter generally contain about 80—84 parts of tin to 16—20 of lead, occasionally also a trifling proportion of zinc, antimony, &c. The finest pewter, known in the trade as "*tin and temper*," is made of tin, with a very small proportion of copper. Britannia metal contains 900 parts of tin to 64 of antimony, 18 of copper, and 18 of brass. It is also largely used for solders ; the common plumber's solder, which melts at about 500° Fahrenheit, consists of 1 part of tin to 3 of lead ; the fine tin solder, which melts at about 360° Fahrenheit, contains 2 parts of tin to 1 of lead.

The wrought iron articles intended to be tinned are taken to the "*tinning*" department,—a large, thoroughly ventilated shop, with a number of vats containing dilute sulphuric acid, technically termed "*pickle*," and several "pots" containing molten tin, covered with a layer of some oily or fatty matter, or some other suitable material, to keep the surface of the liquefied metal free from oxydation. The articles which it is intended to coat with tin are first placed in the pickle, which thoroughly cleans them ; the action of the acid being aided by the application of a gentle heat, obtained by blowing in the steam from the boiler of the engine of the establishment. When the pickle has done its work, the articles are well washed in water, properly dried, covered on the surface with powdered resin, and then dipped into the tin bath ; they are finally wiped and rubbed with hurds. If a vessel is simply to be tinned on its inner surface it is, after pickling, &c., in the usual way, heated, and a portion of the molten metal having been poured in, the vessel is swung and twisted about to apply the tin on all sides ; after which the excess of the latter is returned to the pot.

Artificial Madder.

M. Dumas lately announced to the Academy of Sciences of Paris, that M. Roussin had obtained alizarine (the coloring principle of madder) from naphthaline, as follows:—

A mixture of binitro-naphthaline with concentrated and pure sulphuric acid is placed in a large porcelain capsule heated by an oil or sand bath. By raising the temperature, the binitro-naphthaline dissolves completely in the sulphuric acid. When the mixture has reached 392° Fah., granulated zinc is dropped into the mixture gradually, and with careful observation not to allow the temperature to rise much. In a few minutes a disengagement of sulphuric acid takes place, and the operation is terminated in about half an hour. If a drop of the acid liquid is then allowed to fall into cold water, a magnificent violet color is developed, due to alizarine.

When the reaction is over, the liquid is diluted with eight or ten times its volume of water and brought to the boiling point, and after boiling a few minutes, thrown into a filter. The alizarine is deposited upon cooling as a red jelly ; sometimes adhering to the vessels—sometimes suspended in the liquid. Examined by the microscope, it is seen to be composed of needle-shaped crystals of great definiteness. The mother waters are strongly red from dissolved alizarine, and may be used to dye directly. A quantity of alizarine remains in the filter, which may be removed by caustic alkalies.

In the preceding reaction, the zinc may be replaced by any one of a number of substances—such as iron, mercury, sulphur, carbon, or, in short, by any substance which reacts at a high temperature with sulphuric acid, with the production of sulphurous acid.

The substance thus obtained possesses all the characters and reactions of alizarine. It is but slightly soluble in water, but soluble in alcohol and ether ; volatilizes between 419° and 464° Fah., with a yellow vapor, and gives deep red needle-shaped crystals, whose tone of color is very variable. It is not attacked by chlorhydric or concentrated sulphuric acid. It dissolves in caustic and carbonated alkalies, with a deep purple color. Acids precipitate this solution in deep orange-red flocculi. Like alizarine from madder, it furnishes lakes of the most beautiful colors. It is fixed on stuffs like natural alizarine, and gives similar tints.

Mount Vesuvius.

Professor Palmieri, the resident director of the Royal Meteorological Observatory on Mount Vesuvius, writes to the *Athenæum*, London :

We do not find in the history of Vesuvius so long a period of continued eruption as that of these late years.—Since December 19, 1855, up to the present time, there has been a series of little continued eruptions of greater or less duration, with various phases. That which most attracted public attention was undoubtedly the opening of the cone in seven clefts, toward the end of May, 1858, with a great emission of lava, which devastated much fertile land, filled up the famous precipitous valley called "Fusso Grande," and destroyed fully a half of the carriageable road which led to the observatory. The greater part of this lava issued from the base of the cone, almost without interruption, from the end of May, 1858, to the beginning of April, 1861, that is to say, for little less than three years, which is a perfectly new fact in the history of our volcano.

Prof. Palmieri adds in a postscript:—"Just as I had finished writing the above statement, the guide of Vesuvius made his appearance with the following report, dated May 5 : 'Three small craters have been formed this morning, which make a great noise, but each different. One sounds like a steamer, and throws stones into the air ; another throws large masses out ; and the third, without ejecting matter, makes a noise like the report of a cannon.'"

To Clarify Oil for Rifle Gun Locks.—Fill a phial three parts with almond oil, then fill up the remainder with clean lead chips. Keep the phial in a warm room, and shake it now and then for a month, at the end of which time most of the mucilage acid naturally in the oil will have combined with the lead, and thus the oil will be clarified and fit for lubricating gun locks and other similar work. The lead is easily procured in chips by cutting up with a knife a couple of elongated bullets.—*Septimus Piesse.*

CORN LEAF AND GRASS PAPER.

Paper has been and is now manufactured somewhat extensively from dry grass and straw, but P. W. Runel, of Plumstead, England, states he has made the discovery that paper pulp can be manufactured at less cost, by using green, instead of dry grasses, for its production. He has taken out a patent for the improvement, and he states that when grass becomes dry its silica becomes hard and difficult of solution, whereas, when it is taken green, the silica and other unfibrous substances in it are more easily separated. He takes any green plants, such as sea grasses, which are abundant and cheap, and first mashes, then steeps them in warm water, and after this he boils them in a weak alkaline solution. They are now easily reduced to pulp by passing them between crushing rollers, or through the common beating engines used in paper mills. The pulp is bleached in the usual manner with chlorine.

The leaves of Indian corn are now used for making good paper, in Europe. There is one paper mill in operation in Switzerland, and another in Austria, in which paper is made from such leaves exclusively. The husks, which envelope the ears of corn, make the best quality. It is stated by the London *Mechanics' Magazine* to be excellent, and in some respects superior to that made from rags. As we are dependent upon Europe, in a great measure, for our supply of rags to make our paper, if we can obtain as good qualities from Indian corn leaves, we may yet become the manufacturers of paper for the whole world, as the greatest supply of cheap raw material is found in America. This is a subject worthy of deep attention, as we import rags to the value of about $1,500,000 annually, and paper manufactures to the value of about one millions of dollars.

It is really wonderful to what uses paper may be applied, and what a field there is still left for improvements in its manufacture. We may take some instructions from the Japanese in this department of the arts. A writer in *Blackwood's Magazine*, in describing the manners of the Japanese, says :—"It is wonderful to see the thousand useful as well as ornamental purposes for which paper is applied in the hands of these industrious and tasteful people. Our *papier mache* manufacturers should go to Yedo to learn what can be done with paper. We saw it made into material closely resembling Russian and Morocco leather ; it was very difficult to detect the difference. With the aid of lacker, varnish and skillful painting, paper makes excellent trunks, saddles, telescope-cases, the frames of microscopes ; and we even saw and used excellent water-wroof coats made of paper, which did keep out the rain, and were as supple as the best macintosh, (india rubber). The Japanese use neither silk nor cotton handkerchiefs, towels or dusters ; paper in their hands serves as an excellent substitute. It is soft, thin, and of a pale yellow color, plentiful and cheap. The inner walls of many a Japanese apartment are formed of paper, being nothing more than painted screens. Their windows are covered with a fine translucent description of the same material. We saw what seemed to be balls of twine which were nothing but long shreds of tough paper rolled up. If a shopkeeper had a parcel to tie up he would take a strip of paper, roll it up quickly between his hands, and use it for twine. In short, without paper, all Japan would come to a dead lock." The writer says "Japanese mothers-in-law invariably stipulate in the marriage settlement, that the bride is to have a certain quantity of paper allowed her."

The Japanese do not use rags for making paper, but the inner bark of trees. A partial description of the process of making their paper was given on page 407, Vol. 2, present series of the Scientific American. It is evident from the correspondent of Blackwood, that this peculiar people are far in advance of all the rest of the world in paper making.

Paints from Aniline.—A patent has been taken out in England, by T. H. Smith, of Islington, for obtaining paints from analine as follows :—He makes up a paste with alum and starch, mixed with water, and to this he adds liquid aniline used for dyeing, and stirs the whole together, then passes them through a grinding mill. The mass is now allowed to drip so as to remove from it the excess of water, when it forms a pigment capable of being used as a paint or for staining paper.

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Improved Mode of Case-Hardening Metal Articles.

Case-hardening is the term used for converting the surface of forged iron articles into steel. A number of the parts of gun locks, and the mountings of gun stocks, are generally case-hardened. The old method of conducting the process was to cover the articles with scraps of old leather, hoofs, horns, &c., place them in an iron box, and heat them in a clear fire. It was found that the nitrogen in the hoofs, &c., was the element which caused the conversion of the iron into steel. A chemical, such as the prussiate of potash, containing nitrogen, is now used, as a more convenient substance than leather.

The accompanying engravings, which have been published in the London *Engineer*, illustrate the improvement which has lately been patented by Jules Cazanave, of Paris, and it covers the conversion into steel of wrought-iron, and the cementation of cast-iron, either moulded or in bars. Several chemical mixtures are specified in the patent for carrying out the objects of the inventor, and it embraces some features most useful to every worker in iron.

The processes are as follows :—For wrought-iron a mixture is to be formed of equal parts of any vegetable and animal matters—either solid, liquid, or gaseous,—containing nitrogen, the following being preferred, namely, for the vegetable matters charcoal, soot, or waste from oleaginous matters, or waste from spinning cotton, flax, and other similar vegetable substances, and for the animal substances, woolen rags, woolen waste, flesh, horn, hide, or other similar waste or refuse animal matters. This mixture is inclosed in a gas retort in a proportion of from 8 to 20 per cent the weight of the iron to be converted, and according to the quality of the latter, which is also placed in another vessel or chamber (also closed) in immediate communication with the gas retort, and at the same time with a gasometer, in order to cause an equal and regular pressure of the gas contained in the apparatus. The gas retort and the vessel containing the iron are placed over two furnaces, and the latter is to be heated to nearly a cherry redness, and the former to a less elevated degree. The gas thus produced (which the inventor calls cyanhydrate of ammonia) penetrates the pores of the metal expanded by the heat, and cementation takes place with a rapidity hitherto unknown, and steel is produced very superior in quality to that made from the same iron even by the ordinary process.

For cast-iron a mixture has to be formed composed of about 90 per cent of calcareous matter, either mineral or animal, especially common lime, lime obtained from the calcined bones of animals, or oyster shells, or even iron ore. To either of these ingredients previously triturated, is to be added about 10 per cent of the mixture already mentioned for the cementation of wrought-iron. The pieces of cast-iron are then placed in alternate layers with this mixture in a closed crucible, and in a few hours, according to the thickness, the cast-iron (whether molded or not) is converted into fine hard steel, without the least alteration in form or otherwise.

For partial cementation of wrought-iron articles, the part which it is desired to remain intact is to be covered with mineral or animal calcareous matter, and the cementation penetrates regularly over all the rest of the piece, which is in contact with the gas or cementing mixture. For the partial cementation of cast-iron articles this process must be reversed, that is to say, the parts required to remain intact must be covered with the cementing mixture for wrought-iron, and the part to be converted must be covered with the mixture above described for cast-iron.

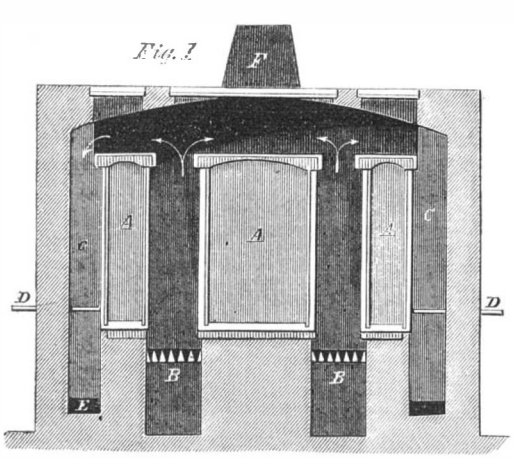
For softening brittle iron the mixture above named for cast-iron, namely, calcareous matters or iron ore, is to be used. By these means, in a very few hours, the most brittle iron is made so pliable and malleable, that it may be bent and straightened again cold without the least cracking, and is easily filed. In this manner, and according to the principles of this invention, iron of very inferior quality can be softened, so as to be easily worked, and when finished as desired, may be brought again to any required degree of hardness.

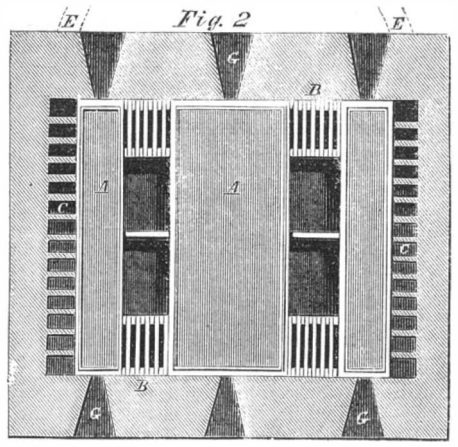
In making cylinders by a combination of these processes, several longitudinal strips of wrought-iron or steel are bound together by hoops or bands, placed at suitable distances apart. The open cylinder thus formed is to be placed in the mould, into which the cast-iron is then to be poured or run, and when cold, the article is to be submitted to the operation above described for cast iron. Other articles requiring strength, hardness, and malleability, may also be thus formed by placing suitable pieces of heated wrought-iron in the mould previously to running in the cast-iron, and then submitting the same to the operation of cementation.

For the cementation of wrought or cast-iron, especially for railway purposes the furnaces which the inventor proposes to employ are composed of hermetically closed chambers or crucibles, the sides of which are vertical, and formed of cast or sheet-iron, covered on the exterior with a coating of fire-clay, to prevent the too great action of the fire thereon. The bottom and cover of each crucible is made of fire-clay, so formed as to make a close joint, and to be capable of being sealed hermetically by means of clay at the time of the operation. The covers of the chambers are movable, and the crucibles are charged and discharged from above by means of a crane, or other suitable apparatus. When the crucibles are charged and closed, the whole of the upper part of the furnace is covered in.

Fig. 1 represents a vertical section, taken through about the middle of the furnace; Fig. 2 is a horizontal section. The furnace is composed of three chambers or crucibles, A A A, the center one being about three times as large as the outside ones. There are four fire-places, B B B B, and the draught is obtained by a series of small flues, C C C C, placed at the sides of the furnace, and each furnished with a separate damper, D, to regulate the draught. These flues descend in the thickness of the walls of the furnace, as shown, and communicate with two main flues, E E, which lead to the chimney, F F. Sight holes, G G, are so arranged as to allow of the inspection of the process going on in the crucibles. The length of the crucibles, and consequently that of the furnace, is determined by the length of the pieces to be operated on.

The matters of ingredients used to produce the cementation as above mentioned, are refuse matters merely dried; they are employed alone without any other mixture, and are placed in contact with the iron (to be converted into steel) in the crucibles, A A A, above named, which are to be intensely heated, the first gas which is evolved, and which is merely hydrogen, being allowed to escape by a cock or valve. This gas may be employed in the fire-places as a means of heating, or it may be used for illuminating purposes. As soon as it is perceived that this gas is no longer formed, the cock or valve must be closed, and the action of the cyanhydrate which is then produced effects the cementation in a rapid manner, and gives a fine grain to any description of iron. The steel thus produced when melted may be greatly improved in quality by adding a certain quantity of resin thereto in the melting pot.





CASE-HARDENING METAL ARTICLES.

When the cementation is produced (whether entire or partial) it is necessary to temper the articles to give them the requisite hardness, especially for rails, or railway tyres or wheels, at the same time preserving their primitive form. For this purpose the inventor proposes to use strong boxes of cast-iron, pierced with numerous holes, in order to facilitate the contact of the water, and the pieces to be tempered are placed therein and solidly stayed or secured in every direction. These boxes, as soon as they are charged with the pieces, are instantly plunged into water.

Black Currant Wine.

The very finest wines are now being manufactured from our fruits. We have red currant wine, blackberry wine, raspberry wine, and also cherry wine, cordial and brandy, besides peach and apple brandy, a liquor from the pear; and thus far no use has been made of the *black currant*, to any extent, save as a jelly or a jam. We learn that in France there is now being made the *liquer de cassis* in large quantities, from the black currant, and millions of plants are cultivated for this purpose. It is said that it is so extensive near Dijon, where there is made in that town about two thousand gallons of wine annually, and so great an interest is felt in this fruit as almost to supersede the cultivation of the vine.

[We have seen the above in several of our cotemporaries, and consider the subject of no small importance. Black currants are very hardy and prolific, and last fall we tasted some wine made by Mr. Bement of Poughkeepsie, N. Y., Superintendent of the Springvale estate of M. Vassar, Esq., which was as good as any imported port wine.—Ed.]

A Cure for Diarrhea.

The Philadelphia *Inquirer* says :—"Numerous requests having been made to republish the recipe for diarrhea and cholera symptoms which we gave in our paper some weeks ago, and which was used by the troops during the Mexican war with great success, we give it below, with a very important correction of an error made in the first formula as to the size of the dose to be given:—

Laudanum, ounces	2
Spirits of camphor, ounces	2
Essence of peppermint, ounces	2
Hoffman's Anodyne, ounces	2
Tincture of Cayenne pepper, drachms	2
Tincture of ginger, ounces	1

Mix all together. Dose: a teaspoonful in a little water, or a half teaspoonful repeated in an hour afterward in a tablespoonful of brandy. This preparation will check diarrhea in ten minutes, and abate other premonitory symptoms of cholera immediately. In cases of cholera, it has been used with great success to restore reaction by outward application."

British Steam Shipping.—The London *Engineer* of June 14th contains some statistics of the progress of steam shipping in Great Britain from 1843. It states that during the past 18 years, 2,306 steamers, of a total burthen of 600,071 tuns, have been built. In 1860, there were 482 steamers engaged in the home trade, and 447 in the foreign trade; making a total of 929. The total burthen of these vessels amounts in the aggregate to 399,494 tuns, nominally. This does not include the river steamers. No less than 26,105 persons are engaged as crews on these vessels. The size of steamers has been constantly increasing. About nine out of every ten new merchant vessels built in England have iron hulls.

Novel Blockade.—Charleston harbor, it is said, may be blockaded very effectually, and vessels loaded with stone will be sunk across the entrance of the port, so as to prevent the egress or ingress of vessels.

We find the above paragraph floating about in several papers. It is not at all likely that the Federal government will resort to any such system of closing a port of entry. The blockade will be maintained in the usual manner—by ships of war.

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Correspondence

LETTER FROM OUR WASHINGTON HOUSE.

WASHINGTON, July 8, 1861.

MESSRS. EDITORS :—The work of printing the patents is being pressed forward with such rapidity that we may hope to see all arrears brought up within a few more weeks. The greater part of the patents of June 11th has already been forwarded, and those of June 18th will probably all be ready for delivery within ten days.

I subjoin, for the benefit of such of your readers as are interested in proceedings before the United States Patent Office, some extracts from the report of the Hon. Commissioner of Patents, and the decision of the Hon. James Dunlop, Chief Justice of the United States Circuit Court for the District of Columbia, in the matter of interference between Thomas Snowden and Ephraim Pierce. The question which gives this case peculiar interest is one of jurisdiction. Since the passage of the new law it has been generally admitted that it is optional with an applicant to appeal from the decision of the Examiners-in-Chief, direct to one of the Judges of the Circuit Court, or first to the Commissioner of Patents, and then to the Judge. This view was sustained by the Commissioner of Patents, who held that, now as formerly, the applicant is at liberty to appeal immediately to the Judge whenever an adverse decision is given by the Patent Office, at any stage of the proceedings.

The same view was contended for by the Hon. E. M. Stanton, late Attorney General of the United States, who, in an able argument on behalf of Snowden, took the ground that every decision rendered in the Patent Office is in law the decision of the Commissioner, the Examiners being merely his assistants. Judge Dunlop takes, as will be seen, a diametrically opposite view.

The portion of the Commissioner's report to the Judge, which refers to the question stated, is as follows :—

The right of appeal from the decisions of this Office, to the Chief Justices of the Circuit Court of the District of Columbia, was originally conferred upon applicants for patents by the 11th section of the act of March 3, 1839. By the 1st section of the act of August 30, 1852, this appellate jurisdiction was extended to the assistant Judges of the Circuit Court.

By the 7th section of the act of July 4, 1836, applicants for patents were authorized to appeal to a Board of Examiners from the decision of the Commissioner of Patents, "upon request in writing," and have their decision. The acts before recited have transferred this right of appeal to the Judges of the Circuit Court, who have hitherto been governed in the exercise of this jurisdiction by the terms of the several sections referred to.

The act of March 2d, 1861, section 2d, created a Board of Appeal within the Office, "whose duty it shall be, on the written petition of the applicant, to revise and determine upon the validity of the decisions made by Examiners when adverse to the grant of Letters Patent," and in interference cases "when required by the Commissioner," in application for the "extension" of Patents, and perform such other duties as the Commissioner may assign them. From their decisions, appeals may be taken, on certain conditions, to the Commissioner in person, by whose prescribed rules they shall be governed. The 17th section of this act of March 2, 1861, repeals all acts inconsistent with its provisions.

The question has been asked whether, under this legislation, it was not the design of Congress, that the applicants for patents should not now be required to exhaust their remedy in the Patent Office before they should be permitted to appeal directly as heretofore to the Judges of the Circuit Court; and it is from a desire to have the views of your Honor on this question, that I have taken the liberty to make the foregoing statement. To my mind it is perfectly clear that a rejected applicant can take an appeal to one of the Judges of the Circuit Court of the District of Columbia, the moment that the Commissioner of Patents pronounces an adversary decision; there being nothing "inconsistent" with this right of appeal in the act of March 2, 1861, of course no repeal of the right or of the jurisdiction is embraced in its terms or spirit.

The 2d section of act of March 2, 1861, provides a new tribunal in the Office for hearing "to revise and determine upon the validity of decisions made by Examiners," in cases recited, and "to perform such other duties as may be assigned" the members thereof, "by the Commissioner," to whom also an appeal may be taken from "their decisions." This section further provides that this appeal from the decisions of Examiners, that are adverse to the grant of a patent, shall be considered whenever asked for, "on the written petition of the applicant," by this new tribunal.

It would seem scarcely to admit of an argument on this state of the patent law, that the same rights of appeal from the decisions of the Commissioner of Patents pertained to applicants of patents now that existed before the act of March, 2, 1861, that that act only gave a new remedy from the decisions of the Examiners when adverse to a grant, or in other cases enumerated; and that the exercise of either right could involve no possible conflict with the other, or with the perfect jurisdiction of the Judges of the Circuit Court of the District of Columbia. These conclusions seem to me to be so entirely consistent with every legal rule for the construction of statutes, that I will not argue them further, but with entire deference submit them to your consideration, with the single additional remark, that the construction here adopted seems best calculated to further the aim of Congress in promoting the useful arts by protecting the inventor—the very object for which the Patent Office was created.

The decision was rendered by Judge Dunlop, June 25, 1861, in the following words :—

Previous to the passage of the act of 2d of March 1861, all judicial acts done in the Patent Office, by the primary Examiner, or the Board of Appeals, organized under the Office regulations, were in the intendment of law, the judicial acts of the Commissioner, and had no legal validity till sanctioned by him. The primary Examiner and Board of Appeals, under the old system, were the organs of the Commissioner, to inquire and to enlighten his judgment, and till the Commissioner gave vitality to their judicial acts by his *fiat*, they had no legal existence as judgments.

Under the act of 2d March, 1861, the primary Examiners, and the Examiners-in-Chief, are, by the terms of the act, recognized as judicial officers, acting independently of the Commissioner, who can only control them when their judgments, in due course, comes before the Commissioner on appeal.

The Commissioner, under this act of March 1861, can give no judgment till the appeal reaches him, and this cannot be done till the judgment of the primary Examiner has first been submitted to the Examiners-in-Chief.

The Judges of the Circuit Court of the District of Columbia, by law, can entertain no appeal except from the decisions of the Commissioner. All decisions of the Office, whether by Examiners or the old Board of Appeals were in law the decisions of the Commissioner, when sanctioned by him. When a primary Examiner, under the old system, refused a patent, or decided an interference case, and the Commissioner approved such decision, an appeal lay directly to one of the judges, from such decision of the Commissioner. Not so under the new law of 1861. The primary Examiner and the Examiners-in-Chief are all, by the act of 1861, treated as judicial officers, having power, without control, within the sphere of their duty, to the exercise of their independent judgment. Their acts, under the new law are not, as under the old system, the acts of the Commissioner, but their own acts. They are no longer the mere organs of the Commissioner, but independent officers. He can only reach and overrule them when their judgments come regularly before him on appeal.

It follows, therefore, that no judgment now, in any patent case, of the character above described, can be given by the Commissioner till it reaches him in due course by appeal; that is to say, the applicant must go from the primary Examiner, by appeal, to the Examiners-in-Chief, and from them by appeal, to the Commissioner, and lastly from the Commissioner to the Judges of the Circuit Court.

The appeal to the Judges lies from the decision of the Commissioner, under the old system, and has not been expressly taken away. We have no right to infer or conclude that it has been taken away by implication, by the creation of the Appeal Board of Examiners-in-Chief, with the right of appeal from them to the Commissioner. All such implication is repelled by the fact, well known, that an express repealing clause in the act of 1861, on its passage through the Legislature, was stricken out.

I think there is no repugnancy between the appeals given by the act of 1861, and the ultimate appeal to the Judges; they may all well stand together.

The ultimate appeal to the Judges is the same appeal which originally, under the old law, laid to the old Board of Examiners, outside the Office, appointed by the Secretary of State.

This appeal, extended to all final decisions of the Commissioner, refusing an applicant a patent, or determining an interference, and was afterward transferred to the Judges of the Circuit Court. I think their appeal to the Judges still exists, but it can only be exercised, after the applicant has gone the rounds of all the tribunals created by the new law, and after the final decision of the Commissioner.

The Coal Oil in Canada.

MESSRS. EDITORS :—I have just returned from our new oil diggings on Black creek, in the township of Enniskillen, county of Lambton, Canada West. I found them very prolific. In one locality on the creek, within the distance of 1½ miles, there has been, and is being sunk, since last March, some 100 *surface* and *rock* wells, not one of which has as yet, when completed, failed to afford a good supply of oil; and hundreds more will be sunk in the immediate vicinity of these between now and fall. Those now there from the Pennsylvania, Virginia and Ohio wells, and they are not a few in number, say that our Enniskillen oil diggings are far more promising than any yet discovered in the United States, and that the oil, both surface and rock, is of a superior quality. And, on experiment, it proves to be a desirable oil for the lubrication of machinery, even in its crude state. One engineer of 14 years' experience running an engine for pumping purposes remarked to me that he was using it wholly, and that it was superior to any oil he had ever yet used. But there is one thing much needed there immediately, viz., good barrel machinery to be run with steam. They cannot get barrels to put their oil in, consequently are obliged to build tanks to hold it for the present. It is a fine opening for the running of good barrel machinery, and there is plenty of good oak timber; also for the sale of small portable engines and good pumps.

At a place called Petrolia, on Bear creek, a few miles from the above-mentioned locality, where there are a number of wells in successful operation, a Boston company are erecting a refinery, (now nearly completed,) of sufficient capacity to refine 90 barrels a day. Others should be erected on Black creek, that they might thereby send to market nothing but the pure article for illumination or lubrication. It would make a saving in both barrels and transportation; although from tests made with this oil in Cleveland and Detroit they pronounce the waste to be only 15 per cent in refining—85 per cent burning fluid, and the balance good for other purposes.

Having no speculative interest in this matter whatever, I have made the above statement in sincerity and truth. C. B. THOMPSON.

St. Catharines, C. W., June 27, 1861.

System of Filing Papers.

MESSRS. EDITORS :—I have a system of filing papers, particularly the SCIENTIFIC AMERICAN, which I desire to communicate to my fellow readers. Here is the system : In a drawer in my reading-room I have arranged a low box with partitions, each partition being designed to hold one volume. When I am done reading the paper *pro tem* I fold it once and place it in the box, relatively to the preceding or subsequent number. By observing this rule as often as I take a paper from the box I am enabled to separate any one from the rest in a minute's time.

SUBSCRIBER.

Mechanicsburg, Ohio, July 3, 1861.

Sawyer's Projectile.

MESSRS EDITORS :—I am, as you suppose, familiar with Sawyer's shot, and personally acquainted with the inventor, having experimented side by side with him (and others) many times at Fortress Monroe.

His projectile has six flanges—the gun of course having a corresponding number of grooves—the main body of which is cast-iron. Its entire exterior is finished by turning and planing. It is then tinned and placed in a metal mould about one-tenth of an inch larger, all over, than the projectile. Lead, or an alloy, is then poured into the mould, which coats the projectile to the thickness of the difference between its size and that of the mould. This construction is described in his patent, the object of it being to prevent the abrasion of the bore and grooves. You may rely on this as being a correct description—at any rate it was so last summer, and I presume he has not changed the construction since.

The similarity in our plans is this: both are flanged projectiles—depending upon fixed flanges, or projections fitting the grooves, to give the required rotation to the projectiles. This system differs, of course, from that where the accessory parts of the projectile are made to expand into the grooves, after the manner of Cochran's, James', Hotchkiss', &c. I will mention that the flanges of Mr. Sawyer's projectile run the entire length of the cylindrical part. The rear end of the iron portion of the projectile is chambered off, which makes a larger or thicker mass of the coats ing at that point than any other. Mr. S. intend- that the action of the powder will upset this part, and thus close the windage. His original intention was in all cases to use a patch, but that involving too much time, he has since dispensed with it, with no loss of accuracy or range, or increase of the charge of powder, although there is a good degree of windage. I will say nothing about the expense of his projectile, the danger of stripping, &c., but will remark that if a simple iron projectile will answer all purposes, what is the use of expensive accessories?

JOHN M. SIGOURNEY.

ADMINISTERING MEDICINE TO HORSES.—Geo. Beaver writes thus to the *American Agriculturist*:—

I consider the usual method of giving medicine to horses by drenching, as it is called, highly objectionable. In this process, the horse's head is raised and held up, a bottle introduced into his mouth, his tongue pulled out and the liquid poured down. In his struggle, some of the medicine is quite likely to be drawn into his windpipe and lungs, and inflammation and fatal results sometimes follow. A better way is to mix the medicine with meal, or rye bran; make it into balls, pull out the horse's tongue, and place a ball as far back in his mouth as possible, then release his tongue, and he will almost certainly swallow the ball. Or the dose may be mixed with meal and honey, or other substance that will form a kind of jelly, placed upon a small wooden blade made of a shingle, and thrust into the back part of his mouth, when he will very easily swallow it.

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[Reported for the Scientific American.]

NOVA SCOTIA PATENT LAW.

SECTION 1. Whenever any person resident in the Province, and who shall have resided therein for the period of one year, or any British subject, who shall have been an inhabitant of Canada, New Brunswick, Prince Edward's Island, or Newfoundland, for the space of one year previous to his application, shall apply to the Governor, alleging that he has discovered any new and useful art, machine, manufacture, or composition of matter, or any new or useful improvement thereon not theretofore known or used, and pray that a patent may be granted to him for the same, the Governor may direct Letters Patent to be issued, reciting therein the allegations of such petition and giving a short description of such invention, and shall thereupon grant to the person so applying for the same, and his representatives, for a term not exceeding fourteen years, the exclusive right of making, using and vending the same to others, which Letters Patent shall be good and available to the grantee, and shall be recorded in the Secretary's office, in a book for that purpose, and shall then be delivered to the patentee.

SEC. 2. Where any Letters Patent shall be obtained by any person for any such invention, and thereafter any other person shall discover any improvement in the principle or process of any such invention, and shall obtain Letters Patent for the exclusive right of such improvement, the person who shall obtain such new patent shall not make, use, or vend the original invention, nor shall the original patentee make, use, or vend any such improvement.

SEC. 3. The simple change of form or proportions of any machine or composition of matter shall not be deemed a discovery or improvement within the meaning of this chapter.

SEC. 4. Persons applying for Letters Patent, on delivering in their petition, shall pay into the Secretary's office twenty shillings, to be applied as other fees payable therein.

SEC. 5. Any person may receive from the Secretary's office any copy of such Letters Patent, or of the petition whereon the same were granted, or of any paper or drawing connected therewith, on paying sixpence a folio, and a reasonable fee for every copy of such drawing.

SEC. 6. Before any person shall obtain any Letters Patent, he shall make oath in writing that he verily believes that he is the true inventor or discoverer of the art, machine, or composition of matter, or improvement, for which he solicits Letters Patent, and that such invention or discovery has not been known in this Province or any other country; which oath shall be delivered in with the petition for such Letters Patent.

SEC. 7. The affidavit may be sworn by the person making such application before any judge of the Province or colony in which such person shall reside.

SEC. 8. Before any person shall obtain any Letters Patent he shall deliver into the Secretary's office an intelligible and exact description of such invention, and of the manner of using, or process of compounding the same, so as to enable any person skilled in the science of which it is a branch, to make and use the same; and, in case of any machine, shall deliver a model, and explain the principle by which it may be distinguished from other inventions, and shall accompany the whole with drawings and written references where the case admits of drawings, or with specimens of the ingredients sufficient for the purpose of experiment where the invention is a composition of matter, which description, signed by such person and attested by two witnesses shall be filed in the Secretary's office, and copies thereof, certified by the Provincial Secretary, shall be competent evidence in all courts where matters concerning such Letters Patent may come in question; but the Governor may, upon special grounds being shown, dispense with the delivery of the model at the Secretary's office if he shall deem it right to do so.

SEC. 9. Any patentee may assign all his right in such invention and discovery to any person; and the assignee thereof, having recorded such assignment in the Secretary's Office, shall stand in the stead of the original patentee as well as regards his rights as all his liabilities; and the assignee of such assignee shall also be considered to be in the stead of the original patentee.

SEC. 10. Whenever any Letters Patent shall be granted to any person, and any other person, without the consent of the patentee or his representatives first had in writing, shall make, use, or sell the invention or discovery whereof the exclusive right is secured to such patentee, the person so offending shall be answerable to him or his representatives in damages.

SEC. 11. The defendant in any such action may give this chapter and every special matter in evidence to prove that the specification filed by the patentee does not contain the whole truth relative to the invention or discovery alleged to have been made by him, or contains more than is necessary to produce the desired effect, which concealment or addition shall fully appear to have been fraudulently made, or that the invention or discovery so secured by Letters Patent was not discovered by the original patentee, but has been in use or has been described in some published work anterior to the supposed invention, or discovery of such patentee, or that such patentee has surreptitiously obtained such Letters Patent for the invention or discovery of some other person, in either of which cases, upon proof thereof, the verdict shall be found and judgment entered thereon for the defendant with costs, and such Letters Patent, by the court, shall thereupon be adjudged void.

A true copy from the statutes. ROBERT STUBS.
Notary Public and Patent Agent.

Night Telegraph Army Signals.

MESSRS. EDITORS:—My attention has been directed to Mr. Tuttle's letter in regard to a system of night signals based on short and long flashes of light, thereby imitating the dot and line alphabet of Morse.

The idea is not new, as I applied the same system during the winter of 1844, by means of two parabolic reflector lamps, the short and long flashes being made with a movable slide or screen, worked with a a lever, for telegraphic purposes. The experiments were made in Baltimore, in presence of several gentlemen, during my superintendence of the government experimental telegraph office in that city, under the direction of Professor Morse, the Superintendent of United States telegraph lines. All of the experiments proved satisfactory, at that time, but the mode of signaling was objected to by masters of merchant vessels, as well as by navy officers, from the fact that trained operators would be required, and therefore the system could not be generally introduced.

About this time, (1844,) I proposed to Lieut. (now Captain) Ringgold, U. S. N., to apply the short and long flashes of light to telegraph, by means of the electric light. This was also objected to for the same reason.

At a subsequent period, in 1847, Mr. B. F. Coston, Superintendent of the Naval Laboratory at Washington, prepared a system of night signals composed of brilliant fires, which I considered better adapted to the purpose.

My object in addressing this note is to claim the invention, reserving the right to offer it to the government or to patent it hereafter. At present, however, I must say, in justice to Mrs. Coston, the widow of the late B. F. Coston, U. S. N., that the signal lights, recently furnished the Navy Department, under the patent granted for Mr. Coston's invention, surpass all I have seen in the United States or in Europe, and therefore that lady's invention is well worthy of the patronage of the government.

HENRY J. ROGERS,
Telegraphic Engineer.

[Our correspondent could not now secure a valid patent for this discovery, as it is manifest that he has abandoned it to the public. Inventors ought never to delay making application for their patents in this manner—they are sure to regret it. Almost any invention is worth the cost of a patent.—EDS.

THE largest dredging steamboat in the world has lately been built in Glasgow, for the purpose of deepening the Tyne river in England. It is 149 feet in length, 38 in breadth, and 11 in depth. It has a single beam engine of 60 horse-power. It is 700 tuns burden, and cost about $100,000. It has arrived at its destination and by this time is raising the mud from the bed of the Tyne.

TRIAL TRIP OF THE STEAMER "SHANTUNG."

The engineers' trial trip of the new steamer *Shantung* came off on Monday, the 8th inst., and was very successful. This vessel is the property of Augustine Heard & Co., of Boston and China, and is designed for the special use of the owners in China. The hull was built by Thomas Collyer, of this city, and is of the following dimensions:—Length, 151 feet; breadth of beam, 26½ feet; depth, 9½ feet. She is strongly built, and is diagonally braced with iron strips. Her hold has a capacity for 225 tuns of cargo; and her cabin is constructed to accommodate her officers and a moderate number of passengers. It is fitted up with great taste, and every convenience. The quarters for the sailors and firemen are in the extreme forward end, and are very comfortable and well ventilated. She has two masts, and is half-rigged, with yards on the foremast. The engine of the *Shantung* was built at the Neptune Works, Eighth-street, E. R., this city. The diameter of the cylinder is 36 inches; stroke, 10 feet. The wheels are 22 feet in diameter. The engine is an overhead beam, similar to our river boat engines, and beautifully finished.

The model is beautiful, and the workmanship of the hull and machinery does credit to our nautical architects and engineers. We have no doubt but she will elicit the admiration of John Chinaman when she reaches the celestial kingdom. Her chief business will be the carrying of opium, and she will soon be ready to proceed upon her voyage to the Chinese seas.

She started from the foot of Eighth street—below the Neptune Works—at 9 A. M., proceeded out to the Light Ship, and returned, making an average speed of about 16 knots per hour. "The winds were fair, the sky was clear, no breeze came o'er the sea," and the steam engine did its duty well. There was a pleasant party of gentlemen guests aboard, invited by P. L. Everett, Esq., one of the proprietors of the vessel, and all things passed off pleasantly.

The New Gunboat Contracts.

The contracts for twenty-three new gunboats, of 500 tuns burthen each, have been given out, and the work divided among a great number of establishments, so as to get it done as quickly as possible.

The hulls are given out as follows, one to each party, according to the information we have received: John J. Abraham, Baltimore, Md.; M. Thatcher, Wilmington, Del.; John Lynn, Jacob Birley and Hillman & Stracker, Philadelphia; Jacob Westervelt, John English, T. Stack, J. Simonson, E. & H. Pouillon and Webb & Bell, New York; E. & W. Goodspeed, East Haddam, Mass.; Marsen Fish & Co., Mystic, Conn.; Gildersleve & Sons, Boston; Paul Curtis, A. & G. Simpson, and Curtis & Tilden, Newburyport, Mass.; G. W. Jackson, Jr., Thomaston; G. W. Lawrence, Belfast; C. P. Carter, Portland; J. W. Dyer and Larabee & Allen, Bath, and N. N. Thompson, Kennebunk, Maine.

The contracts for the machinery are given out to the following firms: Charles Reeder, Baltimore, one; Chester Iron Works, Chester, Pa., one; Merrick & Co., Philadelphia, one; Morris & Co., do., two; Novelty Works, three, Allaire Works, two, Morgan Works, three, all of New York; Highland Iron Works, Newburgh, N. Y., one; Pacific Iron Works, Bridgeport, Conn, one; Woodruff & Beach, Hartford, one; Harrison Loring, two, Atlantic Works, one, Boston.

AUSTRALIAN GOLD MACHINERY.—A very large capital is now invested in gold mining in Australia. The number of miners engaged in obtaining gold is 107,572 of which there are 60,874 Europeans and 28,100 Chinese. There are 294 steam engines of the aggregate power of 4,137 horses; also 3,957 horse puddling machines, 354 horse gins, and 128 water wheels. These are all used in the alluvial workings. Beside these, there are used in the quartz mining and crushing 420 steam engines, equal to 6,696 horse-power, 6 water wheels, 40 horse crushers, and 184 horse gins. The aggregate ratio of the mining plant (machinery, &c.) is about $6,000,000. The government is about to engage in the building of great reservoirs to store up rain water for the alluvial diggings. They have adopted a method nearly like the American Wykoff & Fell patent system of amalgamating gold in Australia.

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Improved Pneumatic Spring.

Air springs for railroad cars have been somewhat extensively used, and were found to work satisfactorily in every respect except the difficulty of preventing the air from leaking out, either around the piston or through the walls of the cylinder. The spring which we here illustrate was invented by J. W. Hoagland, a practical engineer, for the purpose of obviating this objection, and from the experiments made, seems to accomplish the object perfectly. The invention consists of two arrangements, one the lining of the cylinder with a thin sheet of india-rubber to prevent any leakage, and the other a pump operated automatically by the motion of the spring, to force air into the cylinder to supply the loss by leakage should any occur.

Fig. 1 of the engravings represents an outside view of the apparatus, and Fig. 2 is a vertical section. The cylinder, A, may be made of cast-iron with the hollow piston, E, which supports the weight of the car, working loosely into its upper end. The lower portion of the cylinder is filled with a close bag of india-rubber, lining it completely, and on this the lower end of the piston rests. Air is forced into the india-rubber lining of the cylinder, and compressed sufficiently to sustain the car and its load.

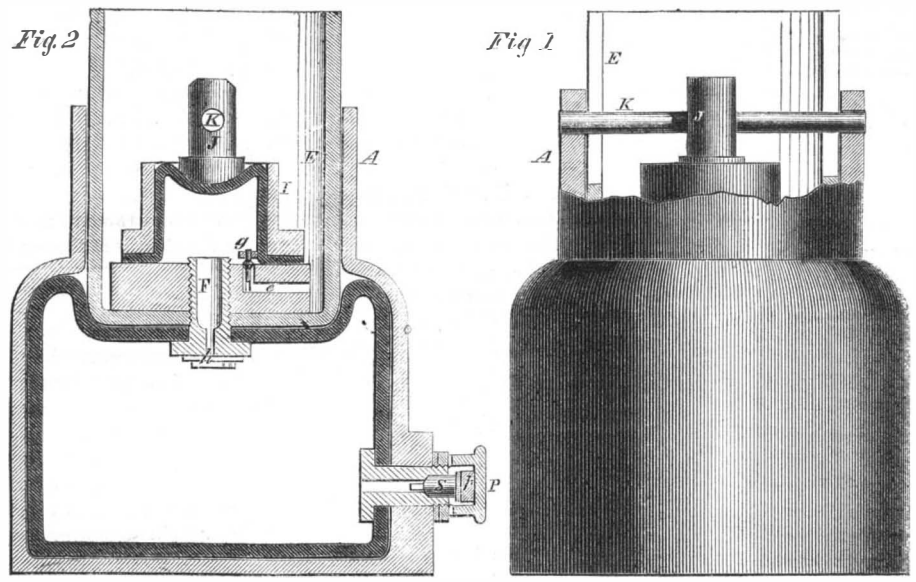
To prevent friction as the piston is forced into the cylinder the lower portion of the latter is enlarged, thus allowing the india-rubber lining to roll downward, without bringing the folds in contact. This is one of the principal features in this invention.

It is supposed that this india-rubber lining will hold the air in the cylinder, A, an indefinite period of time, but in case it should leak a little, or should it be thought in some situations desirable to dispense with it, arrangement is made for forcing air into the cylinder. The device for this is very ingenious. A small cylinder, I, also lined with india-rubber, is placed in the middle of the piston or plunger, E, and is provided with a plunger, J.—This plunger has a stiff rod, K, passing through it and into holes in the main cylinder, A, so as to hold it constantly in the same position in relation to the main cylinder; the piston, E, being provided with vertical slits, so that its working up and down may not be prevented by the rod, K. A passage, *e*, leading from the external air into the cylinder, I, is provided with a valve, *g*, opening inward, and the passage, F, leads from the cylinder, I, into the main cylinder; a valve, *h*, permitting the flow of the air downward, but preventing its return. From this arrangement it will be seen that as the piston, E, rises, the air is forced from the cylinder, I, into the main cylinder, while the descent of the piston, E, again fills the cylinder, I, from the external air. By this plan the air is drawn into the main cylinder at a time when the latter is most relieved of pressure.

As this constant forcing of air into the cylinder, A, would soon compress the air to too great a degree for the action of the spring, it is necessary to provide some means for the escape of the air when the proper degree of compression is exceeded. To this end, an opening, N, is made into the cylinder, A, this opening being closed by a valve, S, which is pressed against its seat by a spring, *p*, the tension of this spring being easily adjustable to any degree of compression desired. A longitudinal groove is made in the upper side of the valve, S, so that when the latter is forced away from its seat, the air may escape. The tension of the spring, *p*, is regulated by screwing the cap, P, a greater or less distance upon the cylinder which surrounds the valve.

For a common railroad car the springs would be about nine inches in diameter, and nine inches in hight.

The mechanical engineer who devised these ingenious modifications is satisfied that he has overcome all the difficulties encountered in the use of the air spring; and that, by the adoption of his improvements, the great advantages of that most perfect of all springs can be practically realized. This spring can be made of the cheapest quality of cast-iron, as the rubber lining prevents leakage through the metal however porous it may be; and any railroad company adopting it can have the springs made in their own workshops. It is applicable to other vehicles as well as to railroad cars, and in short is claimed to be the cheapest, most compact, and most durable of all carriage springs.



HOAGLAND'S PNEUMATIC SPRING.

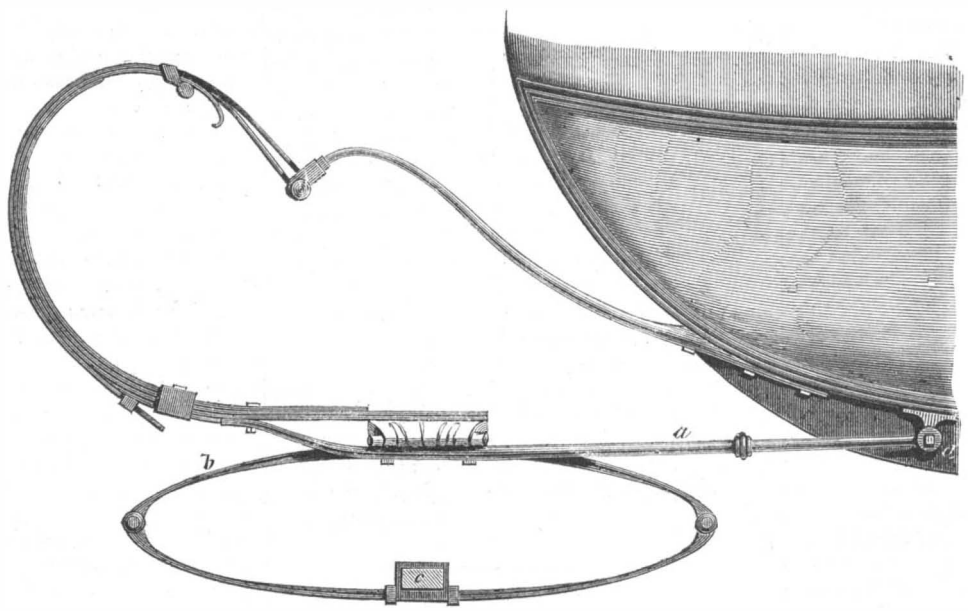
Improved Carriage.

The object of the improvement in the mode of constructing pleasure carriages, here illustrated, which was invented by Mr. Charles B. Wood, of the firm of Wood Brothers, carriage manufacturers, of this city, is the saving of weight and cost in C spring carriages, and the production of a peculiarly soft, silent and elastic spring.

When carriages are hung upon C springs and thorough braces of leather, in the old style, the springs are held in place by a heavy wood perch or reach plated with iron, and stayed with strong braces of iron and wood, the weight of the body and passengers being suspended from the points of the C springs, rendering this perch necessary to keep the springs in place; therefore, the great weight and expense attending the construction of C spring carriages have conspired to drive them out of use, notwithstanding their elegant appearance and many advantages. Mr. Wood's invention retains all the beauty and advantages of the old method, with the lightness of the modern no-perch carriage. Abandoning as worthless the heavy reach or perch, with its ponderous braces, &c., he has contrived to hold in place the C springs by counter stays, as represented in the cut, and has secured his invention by Letters Patent.

This is done by bracing the axletree directly from the carriage, and may be effected by several mechanical devices all essentially of the same character. One plan is to introduce a spring brace between the end of the elliptical spring, on which the C spring rests, and the body of the carriage. The plan, however, to which Mr. Wood gives the preference, is the one represented in the engravings. A stiff iron rod (or it may be a steel spring) *a*, is securely bolted to the upper leaf of the elliptic spring, *b*, which is secured to the axletree, *c*. The forward end of the rod, *a*, is connected with the body of the carriage by a hinge joint, *d*, the bolt of the hinge being surrounded by india-rubber, to obviate any jar or noise arising from concussions.

It will be seen that this arrangement, beside the lightness and cheapness which it secures in the construction of the carriage, interposes either leather or india-rubber between all connections of the spring with the body; and thus causes the carriage to run with very little noise, as well as with remarkable softness and ease to the occupants.



WOOD'S IMPROVED CARRIAGE.

The patent for this invention was granted through the Scientific American Patent Agency, and further information in relation to it may be obtained by addressing Hoagland & McMullen, New Brunswick, N.J.

The patent for this invention was granted through the Scientific American Patent Agency, May 14, 1861, and further information in relation to it may be obtained by addressing Messrs. Wood Brothers, extensive carriage manufacturers, 396 Broadway, New York.

ARMS FOR THE GOVERNMENT.—The Hartford (Conn.) *Press* states that the Sharp's Rifle Company have received an order from the War Department for 6,000 rifles, to be delivered as soon as possible—a job amounting to over $250,000. The works run night and day, employing about 325 men. Col. Samuel Colt received an order from the War Department on the 5th inst., for 25,000 Minié muskets.

TEMPERANCE IN THE ARMY.—Dr. Hamilton, in his new work on military surgery, in treating on the subject of temperance in armies, mentions the interesting fact that, during the Revolutionary War, the Fourth Massachusetts regiment lost, in three years, by sickness, not more than five or six men. This was at a time when the troops were not paid, and consequently cut off from the luxury of stimulants. Similar facts were noticed also during the war of 1812.

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VOL. V. NO. 3.....[NEW SERIES.]....*Seventeenth Year.*

NEW YORK, SATURDAY, JULY 20, 1861.

NEW DESTRUCTIVE CANNON — SHELLPROOF VESSELS.

In the last number of the SCIENTIFIC AMERICAN, we gave a brief account of some experiments recently made in England with heavy rifled cannon upon a target composed of 10-inch iron plates. It was stated that, with an Armstrong gun firing 110 and 126-pound shots at 600 yards distance, the target of such thick iron plates was smashed to pieces as if it had been composed of pine planks. The result of these trials surprised us. They were altogether unexpected, because experiments had been made previously with Armstrong and Whitworth heavy cannon, firing 80 and 100-pound solid shot against 4½-inch iron plates, and these had ended in favor of the plates. As these famous guns had been popularly considered the most destructive known, it had come to be concluded almost a settled matter that iron plates of 4½ inches in thickness were effective safeguards to vessels under most circumstances of battle; hence the vast expenditures already incurred for building mail-clad vessels for the British, French and other navies.

We gave the account of those experiments as they had come to us; but what excited our surprise most, was that the Armstrong gun, under one set of experiments, should have been able to smash 10-inch iron plates to pieces with 110-pound shot, at 600 yards distance, while, in a previous set of experiments, it had not been able to break 4½-inch plates with 100-pound shot, at 400 yards distance. We have waited for some further light upon the subject; it has arrived, and is partly satisfactory. The London *Mechanics' Magazine* states that the new destructive effects upon the thick iron plates were not due to the Armstrong breech-loading cannon—the gun which was boasted to be the most destructive in the world—but to a new cannon constructed by Sir Wm. Armstrong upon an entirely different principle. A particular description of this cannon is not given; it is called a "shunt gun," without an explanation of the term, excepting that, instead of loading it at the breech, it is loaded at the muzzle. From the very general description given of it, we think it is a common rifled cannon, in which winged conical shot fitting the grooves is used—in principle, a copy of the French cannon.

It is also stated that before the new Armstrong gun was tried upon this target of thick plates, heavy shot from powerful smooth-bored cannon had been fired at it for several days without producing the least injurious effect. It is generally considered (although the reasons for such opinions are not very sound) that by doubling the thickness of iron plates, four times the resisting strength is obtained. Therefore, if plates of 4½ inches in thickness were capable of successfully resisting 100-pound shot, 9-inch plates should have been capable of resisting 400-pound shot having the same velocity. Such ideas are now untenable. These experiments teach us that military mechanical engineering is in a very unsettled and imperfect condition. The most destructive weapon of war this week may be rendered obsolete the next week by some new improvement.

An important question now arises respecting the efficiency of iron-clad ships of war. It may be said: What is the use of covering vessels with iron plates of four and five inches in thickness, when 10-inch iron plates are unable to resist heavy solid shot? We have always advocated the use of iron-clad vessels as a safeguard against shells, not against solid shot, and we are convinced that 3-inch plates of the best American Salisbury iron, or tough semi-steel, would resist shells, and these are more destructive missiles than solid shot. And if other nations, such as France and England, have adopted iron-clad frigates, it is necessary that our navy should also be provided with several such vessels to be on something like equal terms with them, for no timber vessel in our navy could stand fifteen minutes' in close action with *La Gloire* or the *Black Prince*.

We also still hesitate to accept in full the statements hitherto published about the breaking of the 10-inch plates. The metal was perhaps poor in quality, or perhaps the plates were not properly fastened. We know that there is just as great a difference in the toughness of various qualities of iron as there is in timber—between basswood and hickory; and the 10-inch plates may have been composed of very inferior iron.

In order to obtain shellproof gunboats of light draught, and, at the same time, obviate the necessity of employing thick and heavy iron plates for sheathing, a combination bombproof outer coating may be used, consisting of 2-inch tough iron plates and an inside packing of prepared cotton.

Mr. J. Chapman states, in his work on the improved American rifle, that at 40 rods distance, with a charge and rifle which sent a picket bullet into three inches of seasoned hemlock, he filled a box 16 inches in depth with cotton-batten, covered its open end with a piece of sheepskin, and fired a number of shots into it, when, contrary to expectation, they penetrated only 10 inches, and their form was "more marred" than if they had been shot into sand. By steeping cotton in a preparation of alum, or phosphate of ammonia, it may be rendered fireproof, so as to make it safe against red-hot shot. With iron plates of two or three inches in thickness to break shells, and a packing of prepared cotton to resist the penetration of solid shot and prevent the spreading of splinters, shellproof gunboats of very light draught may be constructed.

CONDITION OF THE PATENT OFFICE.

The affairs of the Patent Office are moving forward with great regularity and to the satisfaction of its friends. Commissioner Holloway is fully alive to all the duties of his office, and is giving abundant evidence of his interest in the inventor's welfare. It is much to his credit that he is gradually breaking up a *clique* that has long enough exercised a pernicious influence in and about the office, and we are assured that the Chief Clerk, Mr. Hayes, is ready also to sustain the Commissioner in every laudable reform. A number of important removals has been made, and still the work is not yet done. We hope Mr. Holloway will stand his ground and firmly resist the encroachments of all those subtle influences such as enveloped his predecessor. The breaking up of that nonsensical "Board of Revision"—the special pet of Mr. Thomas,—and the recent important change in the mode of examining interference cases, are among the beneficial acts of the new administration.

We say most emphatically, that the present condition of the office is about all that inventors can desire. The coils about the office have been broken—the enemies of a fair and open discharge of its duties are now temporarily discomfited. Let Mr. Holloway and Mr. Hayes see to it that these enemies be kept at bay for the future.

GENERAL BUTLER.

General Butler has under his command some 15,000 men, costing the nation at least $40,000 a day; and the community have been asking why it is that this army is permitted to lie, week after week, at Fortress Monroe in idleness? It now appears that this is no fault of the General's, but that he has been urgently demanding of the government the necessary means to enable him to make a successful advance.

The air is full of rumors that the managers of our military operations are dallying with this rebellion, either with an idea of patching up a disgraceful and short-lived peace, or for the sake of feathering the nests of favorites, or from schemes connected with their own personal ambition. As a part of these rumors, it is whispered that the Cabinet are hampering the movements of General Butler, from jealousy of his rapidly rising popularity, and from fear that the eclat of his military achievements may eclipse their reputations.

Knowing on what slight foundations rumors may be raised, we generally attach to them very little weight indeed, and notwithstanding the positiveness with which the assertions above alluded to are made we trust that they are entirely groundless. We have entire confidence in the honesty of the President, and we cannot believe that any American who has sufficient character to obtain office could be guilty of the awful crime of trifling with the lives of our soldiers and with the fate of the country in this crisis.

If any man who has been intrusted with great power by the nation *is* using that power for his own selfish purposes, we advise him to be very careful not to be found out. The public mind is in an unusually earnest and determined temper, and if a public officer should now be detected in any of these wicked schemes, "it were better for him that a millstone were hanged about his neck, and that he were drowned in the depths of the sea."

ARMY RIFLES.

For many years, the leading nations of the world, when they quarreled, were content to fight their battles and struggle for victory without paying much attention to the character of their implements of destruction. Their generals trusted more to the discipline of the soldiers and their courage, than to their weapons of offence and defence. These days are gone for ever, and military men everywhere are intently bent upon obtaining the most improved implements of warfare. Within twenty years a great revolution has taken place in the equipments of all armies. The old smooth-bored muskets, that were then considered almost perfect, are now being placed in museums, as curious relics of a more unenlightened age—companions of the bow and arrow. This is the case not only with small arms, but is true also of the large engines of war, for field, fort and frigate.

The leading feature of this revolution in implements of warfare, is the substitution of rifles for smooth-bored firearms and cannon. It is not a little remarkable that no new essential principle in the construction of these arms has been discovered; nay, more than this, their advantages were known and pointed out by Robbins, a writer on gunnery, nearly a century ago, but until quite recently their merits were not generally appreciated. It is only within six years that the rifle has been adopted generally for the British army, and less than this for the American army, and yet in 1848, Mr. Chapman advised the arming of soldiers with improved rifles, and the training of them to shoot at ranges from 250 to 1000 yards. His views are now being acted upon in all armies.

It is well known that a rifle is at least four times more accurate than a smooth-bored piece, and its range at least twice as great. Its advantages, therefore, are obvious. But there is great room for improvement in army rifles. Military mechanical engineering is in a transition state at present; great and obvious defects have to be remedied, for there is a great variety of rifled firearms, and there is a great difference in their quality. One very obvious defect in the common musket rifle—American and Enfield—is the great size of bore and the heavy bullet and charge required for it. Thus the bore is .580 of an inch, taking a conical bullet of about an ounce in weight, and a charge of powder in proportion. Now it is well known that target rifles having a bore of $\frac{5}{16}$ of an inch have as great a range, and are equally as accurate, as the large rifles, and are equally as destructive. Why not then adopt army rifles with smaller bore? A light long rifled barrel, with a large bore, is generally held to be necessary for bayonet exercise, but we believe that rifle barrels may be made thicker, and the bore much reduced, with advantage to the soldier. Thus with the smaller bored rifles a soldier could carry three times the number of cartridges in his box, and a great saving of ammunition, combined with greater efficiency, would thus be secured. This is a subject worthy of consideration by all military men, because the army which has the most efficient weapons of war, at the present day, is sure to be victorious in any encounter.

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THE SCIENTIFIC AMERICAN'S ADVICE TO OUR SOLDIERS.---MALARIA AND ITS REMEDIES.

It is difficult for us to realize the fact, but we all know that any soldier is in five times more danger of dying from malarious disease than of being killed in battle.

WHERE MALARIA EXISTS.

What malaria is nobody knows. It may consist of organisms, either animal or vegetable, too minute for even the microscope to detect; or it may be some condition of the atmosphere in relation to electricity, or temperature, or moisture; or it may be a gas evolved in the decay of vegetable matter. The last is the most common hypothesis, but it is by no means proved, and it has some stubborn facts against it. There is no doubt, however, that malaria is some mysterious poison in the atmosphere, and that it is confined strictly to certain localities. It seems to favor valleys rather more than mountains; though the hills of Staten Island and the high lands about Greenwood Cemetery are as full of it as the Valley of the Mississippi. It is not a disease peculiarly of new countries. The region directly south of Rome, called the Campagna, is one of the most malarious localities in the world, and it was settled at least 700 years before the Christian era. On the other hand, the State of Rhode Island and the other parts of New England that are now free from malaria, were always free from it. The inhabitants of paved cities are almost entirely exempt from attacks of malaria.—New York city is situated in a malarious district, and beyond the pavements fever and ague is common. In the fall before work was commenced on the Central Park the writer of this had occasion to enter all of the houses on that 700-acre tract of land, and in almost every one of them one or more of the inmates were suffering from fever and ague. In the paved portions of the city, however, the disease is seldom met with.

THE DIFFERENT FORMS OF MALARIOUS DISEASE.

The mildest type of malarious disease is *intermittent fever*, called, at the West, dumb ague, or more commonly, "dumb ager." It is the same as fever and ague, only that the fever is not preceded by a chill or followed by perspiration. Every one, two, or three days, usually at the same hour of the day, the patient experiences a moderate attack of fever, lasting an hour or two, and the rest of the time he feels about as well as usual.

The next type in severity is the most common form of the disease, the ordinary *fever and ague.* For an hour or more the patient is shivering and shaking with cold, frequently so violently as to make his teeth chatter; and this is as likely to occur in the hottest part of the day as at any other time. Presently the chill subsides and is succeeded by a violent, burning fever, which lasts usually three or four hours, and is followed in the graver forms of the disease by a copious perspiration.

When the paroxysms of fever become so prolonged as to extend from one to the other, and occupy all of the time, the disease is called *bilious fever.* It still preserves its periodical character; at certain hours of the day the fever is less violent than at others; and some physicians describe it as remittent fever.

Occasionally in all malarious districts, and frequently in those which are most infected, bilious fever manifests congestion as one of its symptoms. This is an accumulation and stagnation of the blood in one of the organs, usually in the brain, though occasionally in the lungs. This is the terrible *congestive fever* of malarious districts—one of the most dangerous diseases known. Nearly all of the passengers who died on their way to California, died of this disease, contracted during their detention on the Isthmus.

Sometimes, though rarely, malaria attacks the eyes, producing little hard granules on the inner side of the lid, which cause great irritation and inflammation, occasionally resulting in blindness more or less prolonged. In the summer of 1855 *malarious opthalmia* made its appearance in San Francisco, though any form of malarious disease is exceedingly rare in that city. There were 200 or 300 cases, and a few of the prominent business men were blind for two or three months with it.

But the most dreadful of all forms of malarious disease is *chronic diarrhea.* This was the pestilence that decimated our army in Mexico, and filled our hospitals with the returned soldiers after the war. General Taylor died of it, and it is said that General Scott and Jefferson Davis are both still suffering from its effects. It is a slow, wasting, debilitating disease, and almost entirely incurable. Fortunately, no part of this country is very much subject to this form of malarious disease.

REMEDIES FOR MALARIOUS DISEASES.

The investigations of Louis and his followers have demonstrated that almost all of the diseases to which mankind is subject are nearly or quite uninfluenced by medicine; at all events, by any substances at present known. But there are a few exceptions. There is a small number of diseases that may be cured, and a small number that, like the small pox, may be prevented. The milder types of malarious diseases belong to both of these categories. They may be either cured or prevented. Two substances have been discovered to act as specifics on all intermittent diseases. One of these is a harmless vegetable substance, and the other is one of the most terrible and deadly of the metallic poisons. One is Peruvian bark, the other is arsenic.

QUININE.

In the year 1521, a gallant young Spanish soldier, Don Inigo Lopez de Recalde de Loyola, afterwards called Saint Ignatius de Loyola, received a wound while defending the city of Pampeluna against the French. During his convalescence he spent his time in reading the lives of the saints, and his devotional feelings were so excited that he determined to consecrate his life to the cause of religion. In 1534 he founded a small society which took the holy name of Jesus, and which has since grown upon into the great order of Jesuits. In its early days the society was composed of men who were animated by the most earnest zeal for the Christian faith, and who were ready to make the greatest efforts for its propagation. As missionaries they penetrated into every corner of the globe, from Japan to California, and from Siberia to Terra del Fuego. Among the countries which they visited was Peru—that singular rainless region that lies upon the western slope of the Andes in South America. Here the natives told them of a certain lake, the waters of which preserved all who used them from all kinds of sickness. The missionaries soon discovered that the medicinal properties of the water were derived from the bark of a particular kind of tree which grew in great abundance on the borders of the lake. With their extraordinary powers of credulity, they eagerly swallowed the tales of the natives, and concluded that among the marvels of that wonderful land they had discovered the elixir of life that was to banish all disease from the world. Quantities of the new medicine were sent to Europe, with glowing accounts of its power, and it rapidly acquired a wide fame under the name of "Jesuits' bark." Enlarged experience, however, soon showed that its power had been overrated, and that its scope was limited to the treatment of intermittent, and especially of malarious diseases. When used for these diseases, the practice of 300 years, and especially the inexorable statistics of modern investigators, have shown that its effects are more marked and more constant, than those of any other remedy for any disease, in the whole materia medica. It has become proverbial. We have heard a physician, in recommending a new medicine, remark, "Its effects are almost as certain as those of Peruvian bark in fever and ague.

Modern chemistry has succeeded in extracting the medicinal principle from Peruvian bark, so that now the former may be taken without the great mass of crude impurities in the latter. This extract is called quinine.

A prejudice has been created against quinine, we believe mainly by the inventors of patent nostrums for the sake of selling their own wares. Twenty years ago there was a famous pill sold in the Western States as a cure for fever and ague. It was called Sappington's pill, and was a powerful remedy. Dr. Beaumont, of St. Louis, analyzed it, and found that all its medicinal virtues were due to the *arsenic* which it contained. Now, quinine is a vegetable substance, and is decomposed in the system into gases which pass away. But arsenic, like all of the metallic poisons, remains in the system, and if successive doses of it are taken, however small, they accumulate until the quantity becomes sufficient to destroy life. And killing the patient is not the worst of its effects; it produces a frightful train of diseases, more terrible than death. There is no greater folly than the buying of patent medicines to cure fever and ague. If they will cure the disease they must contain either Peruvian bark or arsenic. If they contain the latter they are of course to be avoided; and if the former, it is better to purchase the pure quinine at the druggists than to pay a swindling price to have it mixed with the useless and frequently deleterious compounds that are employed to disguise it.

This substance will almost invariably cure the milder forms of malarious disease, and a few years ago it was discovered, at about the same time both in Italy and this country, that even congestive fever could frequently be cured by enormous doses of quinine. Since that discovery, a considerable number of persons have been snatched from the very jaws of death by spoonfuls of this powerful extract. It is important that the remedy should be properly administered, and when a soldier is attacked he will of course consult the surgeon of the regiment; our advice refers only to the prevention of the disease.

TO PREVENT THE ATTACKS OF MALARIOUS DISEASE.

All experience has confirmed the observation of the natives of Peru, that Peruvian bark has a powerful influence in counteracting the poison of malaria. Though, after malarious poison is absorbed into the system, it sometimes remains many months before manifesting its presence: outside of the tropics it is propagated only in the months of August, September and October; and if during these three months a small quantity of Peruvian bark or quinine is taken daily, it will generally prevent the occurrence of the disease. As much as can be taken up on the point of a penknife—say to the length of half an inch—will, as a rule, be sufficient; though if the dose is doubled it is immaterial. It can be taken by placing it directly on the tongue, as, though bitter, it is a clean bitter, not unpleasant to most people. If the taste is not agreeable, however, it may be put into the coffee at breakfast, when it will not be perceived. We advise all of our soldiers to consult the surgeons of their several regiments in regard to the wisdom of this course, and if it is sanctioned by them, as it will be, to follow it resolutely. The quinine would doubtless be furnished from the army chest, as the government could not expend money more judiciously for securing the efficiency of the troops, and consequently for the vigorous prosecution of the war.

THATCHER'S COMET.

The brilliant comet which made its appearance on the evening of Sunday, June 30th, and which has doubtless attracted attention all over the world, proves to be the same comet which was discovered by Mr. Thatcher, a New York astronomer, on the 4th of April last, while it was on its way toward the sun. It passed its perihelion on the 11th of June, and is now on its return into space. The plane of its orbit is inclined 87° to that of the earth, so that it has shown itself to the inhabitnnts of both hemispheres. As it was visible in the southern hemisphere when it was nearest the sun, it probably presented a far more magnificent appearance to the people of that half of the globe than it did to us. The accounts of it from South America and the Cape of Good Hope will, consequently, be looked for with a good deal of interest.

FLOYD ON REBELLION.—If there are any of our readers who are opposed to the execution of the laws, and the suppression of rebellion against the authority of the Federal Government, we commend to their careful perusal the singularly appropriate quotation from the report of John B. Bloyd, late Secretary of War, which is introduced into the recent report of Secretary Cameron, briefly referred to on another page.

The Mormons defied the Government, their bluster and bravado sank into terror and submission in the presence of ex-Secretary Floyd's powerful force. Floyd whipped the Mormons, and now he turns upon and fights the Government that supported him.

THE petroleum oils do not appear to contain benzole. No doubt many of these oils are isometric, and may agree in density, and in chemical formula with other hydro carbon fluids—such as various essential oils of plants.

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ELECTRICAL SCIENCE.

An instructive lecture, delivered before the Royal Institution of Great Britain, in March last, has been recently published, and contains some very interesting information, which we condense for our columns.

The combustion of metals is a phenomenon dependent on quantity electricity. A battery of two or three cells, which can readily fuse platinum wire, produces no painful sensation upon the tongue, because, although the quantity is abundant the tension is low. The Ruhmkorff coil combines very high tension with considerable quantity; its physiological effects are therefore violent.

The forces of electrical attraction and repulsion are sometimes stated to vary as the square of the intensity, sometimes as the square of the quantity, and sometimes as the square of the distance; but these effects are due to the circumstance that the quantity usually varies in the same ratio as the tension and as the distance. All the phenomena are more rationally explained by the assumption that electrical attraction and repulsion vary in the simple ratio of the quantity and the tension, and of the distance inversely. The instances in which the quantity of electricity present is not simply dependent on the tension, are those in which other electrified bodies are present, which, by their *inductive influence*, affect the quantity present in all bodies in their vicinity, without necessarily affecting their tension. An insulated cylinder, on being connected with the positive pole of Daniell's battery of 600 cells—its negative pole being connected with the earth—had a positively electrified disk made to approach it. One end of the cylinder was thus rendered electrically negative, and it presented the apparent paradox of a negative electrified body giving off a pesitive current to the earth, and *vice versa*. One end was negatively electrified and the other end positively, but the tension was the same everywhere, and a powerful and visible current was given off to the wire connected with the ground.

The fall of tension in electricity is always accompanied by conversion into heat; the ignition of wire by the voltaic current, the intense heat of the voltaic arc, and the heat and light of the electric discharge and of the spark, are all cases of the evolution of heat consequent on the fall of tension, and the quantity of heat evolved is apparently directly proportioned to the fall of the tension within a given space and to the quantity of electricity passing.

In the case of electric telegraph conductors and submarine cables, it has been shown, from carefully conducted and extensive sets of experiments, that the tension falls with the most perfect regularity from the positive pole of the battery to the end in connection with the earth, in accordance with the law of Ohm. The quantity of electricity held under induction varies with the same ratio as the tension; therefore, the distribution of the charge in a submarine cable, follows precisely the same law. If a cable with a current flowing through it, be divided into any number of equal sections, and the quantity in the section connected with the earth be taken as unity—the quantities in all the other parts, whatever may be their number, will be in the ratio 1, 3, 5, 7, 9, 11, &c.

In a voltaic battery, the presence of two metals is not an essential condition. A negative metal is not necessary for the formation of an electric current, but only for its detection and exhibition. A simple mass of copper, iron, zinc, or any oxydizable metal, when laid on the moist earth, forms a complete battery in itself, giving positive electricity to the earth and quickly assuming a negative tension, which it communicates to any other body resting on it or in contact with it, such as a length of submarine cable. If a cable thus charged were removed and applied to a more electro-negative metal, such as platinum, or to a mass of carbon, the charge would return to the earth. By measurement it has been found that the charge thus acquired by a cable, is exactly the same as it the two metals had been employed simultaneously in the ordinary form of a galvanic couple. If a mass of zinc is connected with a non-oxydizable or a less oxydizable metal, and with the earth, the tension being constantly destroyed and as constantly renewed, it will form a constant current and become a voltaic couple. It is the same with a mass of iron occupying the same position as the zinc. If the connection with the earth is made through any inert conducting substance or liquid, instead of through another metal, a constant current is also produced, thus forming the well known case of a voltaic battery with one metal and two liquids. This may account for the rapid corrosion of some marine steam boilers, which use condensed fresh water, when they are connected with copper pipes, and communicate with the salt water.

In recent investigations in electricity, it has been observed that every different dielectric possesses its own specific law of variation and inductive capacity with respect to distance. With air it varies as the distance inversely; with gutta percha it is more nearly as the square root; with india rubber and white wax, it is intermediate between the two; in short, it varies with almost every different substance that has yet been tried.

WAGES OF THE POORER BRITISH CLASSES.

Under this head, the London *Mechanics' Magazine* states that the working men of Great Britain are deeply indebted to the Statistical Society, which has published elaborate papers on the wages of agricultural laborers, mechanics and artisans, thus affording information respecting the improvements in the condition of the "working classes."

Exactly 200 years ago, the justices in some of the English courts fixed the weekly wages of agricultural laborers at 7s. per week in summer, and 6s. in winter. The pay of mechanics at that time was the same as those laborers. In 1824, the average wages of agricultural laborers in nineteen counties of England had risen to 9s. 4d. per week; in 1837, to 10s. 4d. (English); and in 1860, to 11s. 7d. In two centuries, the wages of the worst-paid class of labor has nearly doubled in England, while machinery has increased in a tenfold ratio. Those who have so unintelligently complained that an increase of machinery robbed the workingmen of employment, and thus greatly injured them, have but to look at such statistics for the most complete confutation of their crude reasonings.

During the past two centuries, the wages of most of the mechanical operatives in Great Britain have increased fourfold. Mechanics that received only 6s. or 7s. per week in 1660, now receive from 24s. to 40s. per week. In 1800, the wages of a good mason was 16s. per week; now it is 33s. The increase of wages during the past 30 years has been about 20 per cent. In Manchester, the chief seat of the cotton manufacture, the increase has been from 13 to 25 per cent. The wages of engine tenders in 1839, were 24s. per week; now they are 30s. The wages of piecer boys have advanced from 8s. to 10s. The young men and boys engaged as silk spinners, who received 7s. and 6d. in 1839, now get 10s. A shilling is about twenty-four cents of our money.

These are some of the statistics presented, but they do not convey a correct idea of the real increase in the rewards of labor and the comforts obtained by the working classes, for, with such a great increase of remuneration, there has been a general decrease in the hours of labor and a very great decline in the price of most necessaries of life. In cotton manufactories, there has been a decrease in the hours of labor amounting to about one day in the week, and other mechanics about half a day weekly. The reduction of the hours of labor, it is stated, has not been brought about by the agency of strikes.

The clothing of the working classes has been reduced in price in a far greater proportion than their wages have been advanced. The female factory operatives and domestic servants now dress in silks and the finest qualities of woolen and cotton fabrics. One century ago, only coarse woolen apparel was worn by them; silks and fine cottons were unknown below the nobility and the wealthy merchants.

In short, there has been a most gratifying improvement in the condition of the producing classes of Great Britain, and this improvement is still going on, and, strange as it may seem, this progress seems to go forward as if it had joined hands with all the new improvements and useful applications in machinery. Reasoning from such data, the conclusion is inevitable that those mechanics who invent improvements in mechanism not only benefit themselves individually, but, at the same time, raise their fellow-workers one step higher with every new and useful invention.

European News.

By late news from Europe we learn that the Sultan of Turkey, Abdul Mejid, died on the 25th of last June, and was succeeded by his brother, Abdul Azry Khan. The late Sultan was a man of weak mind, and during his late years a complete inebriate. It is to be hoped that the new Sultan will reign with vigor and conduct his affairs without displaying Mahommedan bigotry against the Christians.

John Campbell, Lord Chancellor, of England, died on the 23rd of June, in London. He went to bed on the night previous in his usual health, and was found dead in his bed next morning, having expired from the bursting of a blood vessel. He was nearly 82 years old when he died, and had risen from the station of an humble Presbyterian minister's son, in Scotland, to fill the offices of Lord Chief Justice and Lord Chancellor of England, and was a Peer of the Realm. He was distinguished for great energy, integrity, and a clear intellect. During five years, while preparing for the bar, in London, he supported himself as a contributor to the London Press. It would thus appear that in England, the highest stations in the realm, with the exception of the crown, are open to the people.

A great fire had taken place in London, by which about $10,000,000 worth of property in houses and merchadise had been destroyed. Immense piles of warehouses were devoured by the fiery element, and the Superintendant Fire Engineer, Mr. W. Braidwood, and several of his men were killed by the walls of a building falling upon them. Such a serious and painful catastrophe has not occurred in London for quite a number of years.

The Abundance of Food.

The most cheering and satisfactory offset to the discomforts, inconveniences and losses induced by the war, says the St. Louis *News*, is the unexampled abundance of food in the land. We have consumed scarcely half the surplus grain of last year, and yet a new crop, larger even than the last, is ripening to harvest. The damage by the army worm is scarcely seen, and not felt at all.

In Illinois the farmers have barns filled with old corn, which they would gladly sell at 15 cents a bushel, and old wheat which they cannot dispose of at 50 cents; and yet, the best crop of wheat and oats ever gathered stands in their fields almost ready for the sickle. In Missouri, Iowa and the entire northwest, there is a similar promise of abundance; and in Kentucky, the harvest, now going on, is said to be all that could be wished.

Speculators in food will not make their fortunes, during the war, by investments in grain. But the people will live. No country was ever injured by cheap food; and it certainly is a cause for profound gratitute to the great Giver of gifts that in spite of the hardships of the war, the necessaries and even the comforts of life are so unprecedentedly abundant and cheap as they are at this time.

Street Railways.

City passenger railways, which were greatly opposed at first in England, are now becoming quite popular. The two tracks—only about two miles long—laid down by Mr. Train in London have been very successful. No less than 170,000 persons were carried over them in seven weeks. The Board of Trade has made a very favorable report upon them, and two other roads, of greater length, are now being constructed in the British metropolis.

In Bristol, Portsmouth and Exeter, arrangements are now being made for introducing the system. The next improvement will be the adoption of steam or compressed air engines, in place of horses, for working such roads. We ought to show the English a good example in this line also.

A Trick in the Leather Trade.—We have lately seen considerable quantities of upper leather, of hemlock tannage, colored with yellow ochre and other substances to resemble oak tanned. Such disguises are easily detected; and for the expected profit there is substituted a loss, both pecuniary and moral. We advise the tanners, when there is a demand for oak leather, to leave the hemlock to take care of itself, and honestly produce what is required.—*Shoe and Leather Reporter.*

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ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JUNE 25, 1861.

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*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

1,601.—John Adt, of Waterbury, Conn., for an Improved Lock :

I claim the bolt, B, provided with the yoke, C, at its inner end, in combination with the spring, D, and the hub, E, having the button, m, attached and fitted in the yoke, C, the above parts being placed in a case, A, and all constructed and arranged as and for the purpose set forth.

[This invention relates to a small lock of simple construction, designed for doors of buildings. The object of the invention is to obtain a lock which may be readily inserted in the door, and without cutting away much of the latter, and one which may be constructed with but a little amount of metal and in a very economical manner.]

1,602.—P. Andrew, of Cincinnati, Ohio, for an Improvement in City Railways :

I claim, first, The arrangement of a quadruple track upon a single row of pillars provided with cross-arms for suspending the cars therefrom, as set forth.

Second, I also claim the arrangement of the guide rails, E, to obviate the necessity of using flanges on the car wheels, in the manner and for the purpose set forth.

Third, I claim, the arrangement and combination of levers, K and L, for holding the propelling rope firmly against the groove in wheel I.

Fourth, I claim operating a car or cars by a succession of endless ropes, so arranged that on leaving one endless rope the car detaches itself therefrom and attaches itself to that of the next succeeding reach in the manner and for the purpose set forth.

Fifth, I claim the combination of the gear apparatus, O P Q, with rope, Z, and bar, R, for attaching and detaching the cars from the propelling ropes.

Sixth, I claim the arrangement and combination of wheel, S, and band, T, as described and for the purpose set forth.

1,603.—Nathan Barrett, of New York City, for an Improvement in Pumps :

I claim the two pump cylinders, D D, attached to the ends of a walking beam, B, counterpoised thereon, and having their piston rods, F′, connected by levers and gearing or segments, in such a manner that the pistons will be operated automatically by the oscillating of the beam, B, and all arranged to operate as and for the purpose set forth.

[The object of this invention is to obtain a pump which, in its operation, will lift only the amount of water it discharges, the weight of the whole column of water which is lifted in the ordinary lift pumps being avoided. To this end two pump cylinders are employed which are connected to the ends of a walking beam and connect the piston rods by suitable gearing and levers, one cylinder being made to balance the other, and the whole so arranged that the desired end is obtained.]

1,604.—L. A. Beardsley, of South Edmeston, N. Y., for an Improved Portable Crane :

I claim the combination of the windlass, J, circular way, A, and arm or brace, G, constructed and operated substantially as shown, with each other and with the crane, D E, all in the manner and for the purpose shown and described.

[This invention relates to a novel crane intended for the use of the armer as well as for the engineer. It is constructed so as to combine with strength, lightness and portability, and be of a size adapted to the purpose it is intended to secure.]

1,605.—David Bell, of Buffalo, N. Y., for an Improved Screw Propeller :

First, I claim the socket, F, formed on the back of the blade, substantially as and for the purpose set forth.

Second, I claim the wrought arms, D, connected to the hub in the process of casting in combination with the removable blade, substantially as described.

Third, I claim the combination of the wedges, j, with the dovetail spaces between the shoulders on the hub and blade, for the purpose of changing the pitch of the wheel, substantially as described.

1,506.—B. C. Bibb and G. F. Needham, of Baltimore, and G. W. Dorsey, of Port Republic, Md., for an Improved Apparatus for Curing Tobacco :

I claim the combination and arrangement of a furnace, A, a hot air jacket, B, with or without evaporating pan on its top, heating pipes, G G, direct draft pipe, D, and hot air distributing pipe, H, for the purpose of drying tobacco in a barn or other building, substantially as set forth.

1,607.—G. G. Bishop, of Norwalk, Conn., for an Improvement in Machines for Making Felt Cloth :

First, I claim the carrier combs, N N2, and parts attached thereto, or equivalents, in combination therewith, to constitute the said carrier combs, as a complete device for the purpose, substantially as set forth.

Second, I claim the use of the carrying screws, J and L, having attached thereto cams, S and V, for the purposes specified, and traverse rails, T and U, in combination with the carrier combs, N and N2, and parts attached thereto, or equivalents, substantially as set forth, for the purposes described.

Third, I also claim the use of the triangular grooved cam, X, in combination with the carrier combs, N and N2, and parts attached thereto, substantially as described, and for the purpose set forth.

Fourth, I also claim the use of the pin, R, in the back of the carrier comb, N2, in combination with the weighted lever, Q′, and faller combs, P and P, for the purpose substantially as described, and for the purpose of operating the faller combs, as set forth.

1,608.—R. Blackwood, of Philadelphia, Pa., for an Improved Hydraulic Jack :

I claim the construction and arrangement of the cylinder, D, and the valve seat part, D′, together, in the manner described, and in adjustable combination with the disk, m, which forms the removable bottom of the cylinder, B, as specified, the said part, D′, containing the valves, G H I, and the ways, o o, all constructed and arranged together so as to be readily connected or disconnected, as specified, and to operate substantially in the manner described.

I also claim making the open recess, x, in the hand lever, F, so as to operate in combination with the pin, w, in the manner described, for the purpose or allowing greater facility in connecting or disconnecting the said parts, and also for the purpose of enabling the operator either to avoid, or operate the stem, K′, by means of the said lever, as described, as occasion may require.

1,609.—F. B. Blanchard, of Brooklyn, N. Y., for an Improved Steam Boiler :

I claim the arrangement of the upright tubular superheating vessel, F, upright tubular feed water heating vessel, G, and interposed chamber, b, in combination with each other and with the otherwise separated smoke-box, D, and chimney base, E, substantially as specified.

1,610.—F. B. Blanchard, of New York City, for an Improvement in the Application of Blowers to Furnaces of Locomotives :

I claim, first, The combination of the movable bearing or bearings, b of the fan shaft, the friction roller or rollers, G, and the lever or levers, H, the whole applied relatively to the driving or other wheels of the locomotive, and operating substantially as specified.

Second, The regulating valve, f, applied and operating in the trunk of the blower, under the control of the engineer, substantially as specified.

[This invention relates to the driving of the blower by friction from the peripheries of the driving or other wheels of the locomotive to effect combustion in a closed furnace, and consists in furnishing the blower shaft with friction pulleys or rollers, to work in contact with the peripheries of the said wheels, and the arrangement of the so furnished shaft in bearing movable toward and from the axis of said wheels under the control of levers, for the purpose of bringing the blower into or out of operation at pleasure.]

1,611.—Horace Boies, of Hamburgh, N. Y., for Improvement in Washing Machines :

First, I claim a series of rollers, C D, supported in two rectangular frames, E F, which rollers and frames constitute two movable rubbers, the one being supported upon the other, in combination with mechanism for transmitting the said rubbers, alternate and simultaneous movements in opposite directions, and in parallel planes for the purposes and substantially as described.

Second, I claim the arrangement of the bars, Q, including slots, r, and spring arms, S, including sheaves, S′, with incline slot, u′, spring, U, and lever, T, so that the downward movement of the lever, T, will bring the spring arms into such position as to cause the sheaves to bear with a due amount of pressure upon the rubber frame, E, while the rubbers are in motion, and so that said spring arms will withdraw automatically from such position when the pressure is removed and allow the rubber to be turned up into a vertical position, for the purposes substantially as described.

1,612.—D. M. Boyd, of Indianapolis, Ind., for an Improved Tilting Device in Shingle Machines :

I claim the horizontal adjustable plane, F, with the lever, V, together with the spring, X, and the trigger, P, with its appendages, the coil spring, S, and the scroll spring, O, when these parts or their equivalents are arranged substantially in the manner and for the purpose set forth ; the object and nature of the invention being to secure the tilting of the block table of the shingle machine at the proper moment, and to avoid any change of the table during the time the shingle is being cut.

1,613.—Martin Colton, of Sardinia, N. Y., for an Improved Spoke Shave :

I claim the combination of the adjustable cam face, C, with the stock, A, and knife, B, arranged and operating for the purposes and substantially as set forth,

1,614.—John F. Cory, of New York City, for an Improved Bit Stock :

I claim the combination of the case, H, with the shank, G, and socket, C, by means of the universal joint, in the manner and for the purposes set forth.

1,615.—Abner Cutler and N. Jenkins, of New York City, for an Improvement in Toy Pistols :

We claim, first, So constructing a toy pistol that the projectile will be thrown by a direct blow of the hammer, substantially as described.

Second, Casting the body, that is to say, the barrel and the stock, in two similar parts, each representing exteriorily one half of the body, and each having interiorly a groove, which, when the two parts are brought together, forms the bore, and having also appropriate receptacles for the mechanism, as set forth.

Third, The spring piece, n, or its equivalent, for retaining the bullet, substantially as described.

1,616.—A. W. Dewey, of Boston, Mass., for an Improvement in Water Elevators :

I claim my improved water elevator, having its separate parts, viz., its wheel, C, bent arms, a a, &c., chain, D, buckets, E E, &c., and the cams or trippers, H H, constructed and arranged in relation to each other, and so to operate together, substantially as shown and described.

1,617.—A. K. Eaton, of New York City, for an Improvement in the Process of Manufacturing Malleable Cast-Iron and Steel, and in the De-oxydizing of Iron Ores :

I claim, first, The use of Carbonic Acid for the purpose of removing carbon from cast iron in the production of malleable iron or steel, substantially as described.

Second, The use, in combination with the decarbonizing processes, of the carbonic oxyd generated by such processes in the reduction of iron ore, substantially as described.

1,618.—H. N. Fryatt, of Belleville, N. J., for Improvement in Decolorizing Sirups :

I claim the use of bone black or any other substance capable of decolorizing fluids, assisted by centrifugal force, as in the ordinary centrifugal machine, as a mode of and for the purpose of decolorizing sac charine juices, sirups, or sugar solutions passed through it.

1,619.—Mathew Gill, of Battle Creek, Mich., for an Improvement in Life or Safety Ships :

I claim, first, The employment of the two hulls, A and B, when connected and secured together, as described, the timbers of the upper hull projecting down externally and internally over the upper edge of the lower hull, for the purpose of keeping the upper in proper position upon the lower, substantially as set forth.

Second, The arrangement of the rods, a a a a, the cross timbers, d d, and the braces, c c c c, in the manner and for the purpose set forth.

Third, The employment of the levers, J J, rack bars, H H, as constructed, when used in connection with the rods, a a, as and for the purpose described.

1,620.—J. W. Hardie, of New York City, for an Improvement in Needle Setter and Threader for Sewing Machines :

I claim the needle setter provided with an adjustable gauge, to adapt it to different sewing machines and lengths of needles, and in combination therewith, in one single and complete instrument, the needle threader so arranged as to adapt it to different forms and sizes of needles, substantially in the manner and for the purposes specified.

1,621.—L. A. Hoffman, of Prussia, for an Improved Galvanic Metal Friction Brush :

I claim as a new article of manufacture the described electro-galvanic metal friction brush, the same consisting of a stock containing a series of copper and zinc plates arranged alternately and having felt or other suitable absorbent interposed, as specified, in combination with the curved leather strap, studded with rows of pins of plated silver wire, and the curved zinc plate at the back thereof, the whole being constructed and arranged substantially in the manner and for the purposes set forth.

1,622.—L. P. Jenks, of Boston, Mass., for an Improved Machine for Detaching the Short Fibers from Cotton Seed :

I claim detaching the short fibers not now removed by the cotton gin from cotton seed by means of a machine constructed and used substantially as described and set forth.

1,623.—Gilbert Jessup, of Chapinville, N. Y., for an Improvement in Seeding Machines :

I claim the combination of a seeding wheel having a tooth face and channeled side with the casting, F G, or holding frame, with two seed entrances, for the purpose of sowing fine or coarse seed from the same hopper, substantially as described.

1,624.—Davoust Kern, of York, Pa., for an Improved Process for Preparing the Flanking of Leather for Soleing :

I claim the prescribed manner or process of treating or preparing the flanking of all and every kind of leather used for soling boots, shoes, &c., also for belting, likewise for cards, whether machine, hand or otherwise, thereby rendering it useful, substantially in the manner specified, described and set forth.

1,625.—Charles Korn, of Meriden Conn., for an Improved Machine for Dressing Leather :

I claim, first, The combination of the treadle, M, levers, L, and presser, K, the latter being constructed with guides, k k′, and employed in connection with a knife or scraper frame, I, attached to an endless belt, G, in the manner and for the purposes set forth.

Second, The pivoted spring clearer, S s T, constructed substantially as shown and described, and employed to clean the knife during its continuous motion, as explained.

Third, The combination of the pivoted knee, n, wedge, R, and slide, O, for adjusting the bench, N, as explained.

1,626.—Jacob Kuhn, of Centerville, Pa., for an Improvement in Machines for Hulling and Cleaning Clover Seed :

First, I claim constructing the teeth, n n, of the cylinder, A, in the manner or form set forth and described; the same being arranged thereon in relation to each other, in the manner specified.

Second, I claim constructing the inner side of the concave, B, with the ridges, o o, of teeth, and the grooves, p p, between the said ridges, as set forth and described, and for the purpose of receiving and operating in combination with a rotating cylinder provided with the teeth, n n, constructed substantially as described.

Third, I also claim making the hopper with the two distinct apartments, E E′, as set forth, the apartment, E, being fitted with the adjustable slide, r, for regulating and allowing the discharge of the contents of the said apartment only into the screen carrier below, whilst the apartment, E′, communicates only with the huller, as and for the purposes specified.

1,627.—A. Lebkücher, of Belleville, Ill., for an Improvement in Lubricating Compound :

I claim the lubricating compound derived from the use of rosin oil, muriatic acid, zinc, lime, olive oil, and water, in the manner herein set forth.

[This invention consists in a compound produced by mixing rosin oil (which has previously been refined by means of zinc dissolved in ether] with pure slaked and powdered lime as about the proportion hereinafter described, together with a certain quantity of olive oil and soft water, which is added after the mixture of rosin oil and lime has been heated and allowed to settle, thereby producing a lubricator, which, while it will economize power and prevent wearing, will not become gummy and glutinous, but keep the journals and other parts to which it may be applied, cool and so as to be easily cleaned.]

1,628.—Joel Lee, of Galesburg, Ill., for an Improvement in Water Elevators :

First, I claim the slotted lever, N, in combination with the brake, P for the purpose of unclutching the crank, as described.

Second, The combination and arrangement of the pawl, O, and brake P, as described and for the purpose set forth.

Third, The spring, R, in combination with the slotted lever, N, for the purpose of clutching the crank and raising the brake from the catch, thereby permiting it to fall into the ratchet as described.

Fourth, In combination with the foregoing enumerated devices a horizontal bail or hoop placed at or near the top of the bucket, k, for the purpose of preserving the equalibrium of the bucket and affording convenience in dipping small quantities of water therefrom, when desired, as described.

1,629.—H. S. Lewis, Chicago, Ill., for an Improvement in Processes for Refining Lard :

I claim the pan having a double bottom, inclining downwards from the sides towards the center, and with an arrangement of steam and water-pipes, C D D, and cocks E F G H I I, as herein described.

1,630.—Isaac Lindsley, of Providence, R. I., for an Improvement in Looms for Weaving Hair Cloth :

I claim first, Confining and compressing the lengths of weft at one end, and reciprocating or otherwise changing the position of the compressed position with respect to the device used to select a single length therefrom, and present the end thereof to the hook, nippers or other device, used to insert the length of hair or other material in the web, in the manner and for the purpose substantially as specified.

Second, I claim the lance, k, or its equivalent, substantially as described, for the purpose specified.

Third, I claim the yielding pad, i, or its equivalent, in combination with the lance, k, or its equivalent, arranged and operating substantially as described for the purpose specified.

Fourth, I claim the mode of operation substantially as specified, by means of which a single length of the weft, or several lengths, are selected and separated from the compressed mass or portion of the weft and presented to the hook, nippers or other device used to insert the weft in the warp substantially as specified.

Fifth, I claim the mode of operation substantially as specified, by means of which, in case the lance or equivalent device fails, to select a length of the weft from the compressed mass, its efforts to do so are in consequence repeated several times during a single beat of the lay substantially as specified.

1,631.—Dennis G. Littlefield, of Albany, N. Y., for an Improved Fire Pot for Coal Stoves :

I claim in the construction of base-burning stoves as arranged and fitted substantially according to the specification in my Letters Patent of January 24, 1854, the combination of the supplying cylinder, M, with the rings, or framing, U R, constructed as described in this specification, so as to admit of the use, removal, and replacement of separate bars of soap stone, fire clay, or analogous heat-resisting substances.

1,632.—John McCormick, of Madison, Ind., for an Improved Boiling Apparatus :

I claim an air-tight water-chamber containing water or its equivalent, said chamber being hermetically sealed, thereby retaining its contents, thus constituting them a fixed permanent, unevaporating part of the apparatus; as set forth and for the purposes specified in the foregoing specification.

1,633.—Samuel Metzler, of Naperville, Ill., for an Improved Belt Coupling :

I claim the combination with the ends of a pulley belt, C, of the two metal plates, A A, and the screw bolts, B B; the said parts being constructed and applied in the manner and for the purpose described.

1,634.—George A. Mitchell, of Turner, Maine, for an Improvement in Boot Heels :

I claim the pad, E, united to the upper and soles by screws or rivets, for securing the heel portion of the boot or shoe firmly together, as described, and for receiving the heel, to be thereon secured for the purpose set forth.

1,635.—Porter Mitchell, of Greenfield, Mass., for an Improved Heating Apparatus :

I claim the combination with and arrangement in relation to each and every pair of deflectors of a damper whereby direct communication of the fire chamber with the exit flue may be established or not at pleasure.

1,636.—H. U. Morse and H. A. Morse, of Canton, Mass., for an Improvement in Tobacco Cutters :

We claim an improved tobacco cutter, as constructed, with two curved racks, a a′, two toothed sectors, b b′, and the stationary and movable cams, H I′, and rests, T I, arranged and combined with the lever, D, frame, B, and the knife carrier, C, and so as to operate substantially as described.

1,637.—H. A. and L. B. Myers, of Elmore, Ohio, for an Improvement in Grain Drills :

We claim the conical shelf, v, with the up and down movement of the piston, as and for the purpose described.

1,638.—Mark S. Palmer, of New Bedford, Mass., for an Improved Machine for Filling and Folding Medical Powder Papers :

I claim first, The feed roller, D, bed plate, E′, spring pressure plate, D2, and knife, D3, in combination with the reciprocating fingers or pins, *e2 e2*, working in slots through the lower plate, E, all arranged with relation to the folding box and operating substantially as herein described.

Second, The folding box, constructed with jointed folding sides, F F′, operating as described, in combination with the reciprocating bottom plate, E2, and its side bottom plates, *e4 e4*, as set forth.

Third, The pressing or creasing block, H, operating between suitable guides, *h h*, when said block is arranged in relation to the folding box, and operates as described, to crease the paper preparatory to the folding operation; and in combination with creasing head, I claim the holding fingers, *n n*, or their equivalents, operating substantially as and for the purposes set forth.

Fourth, I claim, in connection with creasing head, H, the plunger, J; and, in combination with this plunger, I claim the hollow stem, or tube, l, tube, *m*, case, *l*, reciprocating measuring block, M, and hopper, *b′*, all arranged and operating conjointly, substantially as herein described,

[This invention relates to certain novel improvements in machinery for preparing strips of paper, filling them with certain quantities of powder, and for folding the powder up in the papers in a proper manner and shape for medical purposes. The invention is intended more

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especially for folding papers containing homeopathic powders, or for folding and filling papers with seidlitz powders, but by varying the size of the parts which receive the papers and fold them, the machine may be adapted for folding large or small papers of powder.]

1,639.—George Parr, of Buffalo, N. Y., for an Improved Camp Chest :

I claim a camp chest constructed in two parts, A and, B having folding legs, D, hinged thereto as shown at e, with springs, F, (or hooks) for holding the legs in a perpendicular position, for the purposes and substantially as described.

1,640.—R. H. Peck and E. M. Gifford, of Wolcott, Vt., for Improved Tube and Pail Machine :

We claim the arrangement of the mandrel, G, the swinging frame, H, carrying the knives, *h* and *h*, the clamp, F L, and the rests, I and N substantially as and for the purpose set forth.

1,641.—C. H. Perkins, of Providence, R. I., for Improved Machine for Making Horse Shoes :

I claim, first, The combination and arrangement of a separate hammer and creaser with a single helve, so that while one is at a state of rest and disconnected from the helve, the other shall be connected therewith and capable of being operated by it independently of the other, substantially as described.

Second, I claim the use of a separate hammer and creaser capable of acting independently of each other in combination with the instruments for giving the first bend to the shoe blank, substantially as described.

Third, I claim constructing the face of the hammer with a raised rim, as described, for the purpose of giving shape to the shoe and also for facilitating the escape of the scale as it is formed.

Fourth, I claim the combination of the prongs, 26, and scraper, 27, or their equivalents, for the purpose of removing the shoe after it has been finished, applied and operated substantially as described.

Fifth, I claim the mode of operation substantially as specified, by means of which the prop is removed from the hammer helve to permit the operations of plating and creasing the shoe to be performed, and at such times relatively to the revolution of the wild-cat as to prevent a half blow from the hammer, as set forth.

1,642.—T. W. Porter, of Bangor, Maine, for an Improvement in Ox-Yokes :

I claim, first, The pieces, A and B, in the construction of ox-yokes, when arranged substantially as described,

Second, I claim forming the ends of yokes of two or more layers of wood, the grain or fiber of one or more layer or layers being placed transversely to that of the other or others substantially as described.

Third, I claim forming that part of the yoke which bears upon the neck of the ox, by bending the wood so that the direction or curvature of the grain or fiber shall conform to the curvature of said part of the yoke.

Fourth, I claim the bow holder, or pin, when used in combination with the yoke substantially as described and for the purpose specified.

1,643.—J. A. Preston, of Boston, Mass., for an Improvement in Bottle Stoppers :

I claim a bottle stopper made with its valve and valve stem entirely of glass as set forth for the purpose specified.

1,644.—George Race, of Norwich, N. Y., for an Improvement in Water Elevators :

The rachet C, with barrel, *d*, attached, placed loosely on the windlass shaft, *a*, in connection with the wheel, E, on the windlass shaft, a, and the spring, F, and eccentric and brake, G *g*, on lever, H, all arranged substantially as and for the purpose set forth.

I further claim the particular arrangement of the spring, F, substantially as shown and described, whereby the spring, E, is made to perform the double function of a friction brake and spring, as set forth.

[The object of this invention is to obtain a water-elevating device which will admit of being operated with greater facility than usual. The invention relates to that class of water elevators in which a windlass and bucket are employed, and consists in the employment or use of a ratchet placed level on the windlass shaft, in connection with a wheel attached permanently to the windlass shaft, and encased within a barrel attached to the rachet, said wheel being acted upon by a spring and an eccentric and brake, whereby the bucket may be elevated by the rotation of a crank, and released at any time so as to descend in the well as gradually as may be desired, and suddenly stopped at any desired point, the descent of the bucket being under the perfect control of the operator.]

1,645.—George M. Rhoades, of Hamilton, N. Y., for Improvement in Machines for Trimming Teasels :

I claim, first, The employment of a revolving tube, c, provided with one or more teeth as described, and for the purposes set forth.

Second, Surrounding tube, c, with an adjustable outer tube, I, substantially in the manner and for the purposes set forth.

Third, Retaining the outer tube, I, at any desired degree of elevation by means of check nuts, H, and springs, F, in combination with rods, g, substantially as represented and described.

1,646.—W. B. Rhoades, of South Dedham, Mass., for Improved Clothes Wringer :

I claim the rolls B and C, with the sliding bearings, g, in combination with the levers, D, and springs, k, arranged and operating substantially as set forth.

1,647.—N. H. Richardson, of Fitchburg, Mass, for Improved Ratan Machine :

I claim, first, The rolls, K, in combination with the rolls, H, upon the opposite side of the scrapers, when the former, K, are of slightly smaller diameter than the latter, H, as set forth for the purpose explained.

Second, I claim so connecting the scrapers with the feed rolls in advance of them by means of the connections described, or their substantial equivalents, that they shall be simultaneously separated for the entrance of the ratan, as set forth for the purpose described.

1,648.—C. W. Saladee, of Pine Island, Texas, for an Improvement in Steam Plows :

I claim, first, The combination of the several parts shown and described, for the purpose of combining in one machine the facilities of plowing, sowing the seed, rolling and harrowing at one operation, as well as to perform either of these objects separate and apart from the others.

Second, I claim the peculiar construction and arrangement of the plows, x, and colters, Y, Fig. 1, in combination with the angle iron ring brace, u, in the manner and for the purpose shown and described.

Third, I claim extending the points, z, of the colters, Y Y, Fig. 1, out beyond the line or circle described by the points of the plows, in the manner and for the important purpose set forth.

Fourth, I claim the radius bars, O O, Fig. 1, but more particularly shown in Fig. 3, shaft, Q Q, shifting pinions, S S, in combination with the crankshaft, L, and revolving drums, C C, for the purpose of regulating the advance of the machine in proportion to the cut made upon the ground at each revolution of the plows, and for the additional purpose of throwing out of gear either one or both of the drums, C C, to facilitate the turning of the machine, as shown and described.

1,649.—Herman Schroder, of New York City, for an Improvement in Breech-loading Firearms :

I claim, first, The movable breech pin, F, when operating as described to cock the lock and lock the barrel.

Second, The movable breech pin, operating as described, in combination with the expansive annular charge chamber, f, as and for the purpose specified.

Third, The shoulders, h, on the dog, G, as and for the purpose set forth.

1,650.—Wm. F. Sheldon, of East Mendon, N. Y., for an Improvement in Melodeons :

I claim, first, A movable keyboard, so combined with the reeds of a melodeon, or the equivalent parts of any other instrument, that, by the aid of a fixed scale, it may be set to play in different keys, substantially as specified.

Second, Combining the so-applied movable keyboard with the reeds, or their equivalent, by means of interposed levers, L L, applied and operating substantially as specified.

Third, The horizontal screw, M, applied in combination with the movable keyboard, substantially as described, to adjust it to or hold it in any desired position.

1,651.—M. A. Shepard, of Bridgeport, Ill., for an Improvement in Water Elevators :

I claim an oscillating or swinging box, C, divided into two compartments, c c, by a central partition, b, and said compartments subdivided into compartments, e e′, by partitions, f f′, the compartments, e e′, communicating with each other by openings, g g′, and all arranged to operate substantially as and for the purpose set forth.

[The object of this invention is to obtain a simple device for elevating water and other substances, either by the oscillating of the device alone on suitable journals, or by the rocking of the support to which he device is attached. The invention is applicable to vessels of navigation, serving, while the vessel is in motion, as a self-acting means for elevating water from the hold.]

1,652.—D. H. Shirley, of Boston, Mass., for an Improvement in Skates :

I claim, first, The arrangement of the screw box to the heel-locking screw, below the heel portion of the body of the skate, essentially as shown and described.

Second, Securing the skate at the heel by the button or head of the heel screw, arranged and applied to gripe on or against the heel of the boot or shoe, as set forth.

Third, The combination of a heel-locking screw with a step or set-off in the body of the skate in front of the heel, and fitted with prongs or spikes to gear with the front of the heel of the boot or shoe, substantially as specified.

Fourth, The combination of the heel-locking screw, spiked set-off or step to the body in front of the heel, and toe cap, all for operation together, essentially as set forth.

1,653.—H. T. Stanard, of Wayne, Mich., for an Improvement in Sash-holders :

I claim the cam, H, lever, L, and elastic substance, F, all arranged and operating as specified,

1,654.—Leopold Thomas, of Allegheny, Pa., for an Improvement in Valves :

I claim attaching the piston rod of lifting pumps, by which the plunger is operated, to the upper valve itself, in such a manner as that the first part of the motion of the piston rod, either on its up or down stroke, shall be to open or close the valve, as the case may be, while the plunger itself is moved by the further stroke of the piston rod, substantially in the manner described.

1,655.—J. A. Whitney, of Maryland, N. Y., for an Improvement in Brakes for Vehicles :

I claim the combination of levers, g and h h, their arms, g1 g2 j k, pivoted together by loose pin, m, connected to the brake bar, E, and operated by the movements of the draft pole, D′, substantially as described and shown.

[This invention relates to an improvement in operating wagon brakes, either by hand or by the movement communicated to them by the rise and fall of the draft pole.]

1,656.—W. F. Wickersham, of St. Louis, Mo., for an Improved Excavating Machine :

I claim the arrangement and combination of the frame, C, the elevators, H, the leader, P, the scraper, J, and the cart, M, the whole to be constructed jointly, substantially in the manner described for the purpose specified.

1,657.—M. D. Wilder, of Laporte, Ind., for an Improvement in Water Elevators for Cattle :

I claim, first, The carriage, C, placed on a circular track, B, in connection with the annular apron, D, frame, J, fence, K, and pump formed of the reciprocating tube, Q, plunger, R, and cylinder, S, the pump being operated from the carriage, C, and all arranged substantially as and for the purpose set forth.

Second, The arrangement, as shown, of the annular trough, L, straight trough, M, and stationary curved discharge pipe, V, whereby the water is discharged into the straight trough, M, the motion of the trough not interfering with the proper delivery of the water.

Third, The arrangement of the shaft, E, crank pulley, F, connecting rod, P, collar, O, and rotating tube, H, substantially as shown, to serve as a means for communicating power from the carriage, C, to the pump.

Fourth the employment or use of the decoy vessel, N, when used in connection with a pump and its operating mechanism, substantially as and for the purpose specified.

[This invention relates to a new and improved water-elevating device, by which stock may raise their own water, and to which a horse may be applied when necessary for raising water. The invention consists in the use of an annular apron placed on a carriage and circular track, in connection with a fence and pump, all arranged to effect the desired end.]

1,658.—J. D. Custer, of Norristown, Pa., assignor to Wm. McNiece, of Conshohocken, Pa., for an Improvement in Cutting Saw Teeth :

I claim the combination of the plunger, G G, and its long screw and long nut, 4, with the toothing punches, J K, all substantially as described and shown, for toothing and setting saws.

1,659.—J. E. Earle, of Brooklyn, N. Y., assignor to himself and Samuel Hathaway, of New York City, for an Improvement in Machines for Making Tape Trimmings :

I claim the folders, D E F G and H, or their equivalents, constructed and operating in the manner and for the purpose substantially as specified.

Also, the combination described of folding instruments, D E F G and H, the pressers, E′ and F′, and the continuously rotating spool-holder, H′, all constructed and operating together in the manner and for the purpose set forth.

Also, in combination with a folding instrument, operating substantially as described, the carrier, D′, rotating therewith, for the purpose set forth.

Also, in combination with a folding instrument, D, and carrier, D′, a holder, C′, operating in the manner and for the purpose specified.

1,660.—D. R. Gamble (assignor to himself and J. M. Connel), of Newark, Ohio, for an Improved Washing Machine :

I claim the special arrangement of the roller or balls, a′ b′, with the revolving arms, in combination with the ribs or projections, g, upon the side and bottom of the tub and cover, when used and operating for the purpose set forth.

1,661.—W. R. Kay and H. E. Kay, of Westerly, R. I., assignors to themselves and B. D. Kay, of Fall River, Mass., for an Improved Car Brake :

We claim, first, The brake wheel, D, drum, C, and axle, b, so combined and connected, by means of suitable gearing, substantially as described, that when the brake is applied to the brake wheel, D, the drum, C, is caused to turn in a direction opposite to that of the axle, and thereby to wind up the spring, L, or its equivalent, substantially as and for the purpose set forth.

Second, We claim the ratchet levers, P and P′, in combination with the pawls, N and N′, and chain, H, or its equivalent, so arranged that the winding of the chain on the drum, C, in either direction brings into play the proper pawl, as set forth.

Third, We claim the multijointed strap, R Z, in combination with the spring, U, levers, V and V′, and link, v, the whole operating together substantially as and for the purpose specified.

Fourth, We claim the combination of the toggle, W W, the levers, V and V′, the tie, v, and the jointed or flexible strap, R, substantially as and for the purpose set forth.

1,662.—William Lape (assignor to himself and Fred'k R. Stow), of Troy, N. Y., for an Improvement in Plows :

I claim a plow having its landside, A, share, B, moldboard, C, and beam, D, all constructed and united together in the manner shown and described.

1,663.—W. G. Mackay, of New York City, asssignor to P. P. Comen, of Bridgefield, Conn., for a Machine for Bronzing Wall Paper, &c.:

I claim the arrangement of the trough, C, bronze distributor, E, whipping plate, H, and endless apron, F, when arranged and operated in the manner described, and for the purpose specified.

In combination with the same, I claim the whipping plates, K K, when arranged and operated in the manner described and for the purpose as set forth.

1,664.—J. W. Osborne, of Melbourne, England, assignor to S. T. Hooper, of Charlestown, Mass., for an Improvement in Photography :

I claim, first, The preparation and use, in making photolithographic transfers, of a paper prepared by applying, in conjunction with the sensitizing substances or preceding their applications, a coating of albumen to the surface of the paper, and coagulating the albumen so applied by heat, in the manner and for the purposes described; and,

Second, I claim the use and application of gelatine in conjunction with albumen, for the formation of the coating of organic matter applied to the surface of pholithographic transfer paper, which gelatine, by its swelling properties when acted upon by moisture, enables me to obtain the result described.

1,665.—G. W. Richardson (assignor to himself and Robert Glover), of Grayville, Ill., for an Improvement in Harvesters :

I claim the arrangement and combination of the bracket frame, G, draft pole, A, and driver's seat, S, with the gearing, D E O N, and shaft, M, substantially as and for the purpose set forth.

[The object of this invention is to obtain a simple and efficient arrangement of parts to render the draft of the machine as light as possible, and, at the same time, admit of a very ready raising and lowering of the cutting device.]

1,666.—G. H. Smith (assignor to S. O. Smith), of Rochester, N. Y., for an Improvement in Gas Regulators :

I claim, first, The employment in portable gas regulators, of a long cylindrical valve, operating as described, and moved longitudinally by means of the back pressure of the gas upon an overcharged cushion of confined air, to the covering of which the valve is connected.

Second, Attaching the valve to one leaf of a double diaphragm, or to a ring of rubber attached to the single diaphragm, substantially as and for the purposes set forth.

1,667.—Wm. F. Trowbridge (assignor to F. Bingham & Co.), of Feltonville, Mass., for an Improved Machine for Skiving Boot and Shoe Soles :

I claim the skiving machine consisting essentially of the revolving cutter head, F, and adjustable collar, K, arranged and operating substantially as described.

RE-ISSUES.

98.—Wm. N. Whiteley, Jr., of Springfield, Ohio, for an Improvement in Harvesters. Patented Nov. 25, 1856 :

I claim, first, In combination with the main ground wheel frame of a harvesting machine, the sector plates, f f′, provided with the adjustable boxes, g g′, or their equivalents, substantially as shown and described, for the purposes specified.

Second, In combination with the sector plate, f, a projecting lip for the shipper's fulcrum pin, substantially such as shown and described, for the purposes specified.

Third, Retaining the pinion on its shaft by means of the shipper, or its equivalent, by which said pinion is thrown in and out of connection with its clutch pin substantially as shown and described, for the purpose stated.

Fourth, So connecting or combining the driver's seat of harvesting machines with the front end of the frame of the same, when used for reaping, that when the driver is on his seat his weight will either raise and hold up the rear end of the wheel frame to which the cutting apparatus is connected, or both the rear end of the frame and the center of the finger bar, for the purposes specified.

DESIGNS.

68.—C. S. Chaffee (assignor to the Bay State Glass Company), of East Cambridge, Mass., for a Design for Tumblers.

69.—H. W. Hayden, of Waterbury, Conn., for a Design for a Mat for Daguerreotype Cases.

70.—James Hutchinson (assignor to J. E. Whipple), of Lansingburgh, N. Y., for a Design for an Oilcloth Pattern.

71.—James McDuff (assignor to N. McGraw and W. A. Taylor), of Morrisania, N. Y., for a Design for Coffins.

New American Cyclopædia.

The twelfth volume of this great work, carrying the alphabet from MOZ to PAR, has made its appearance. It is published by D. Appleton & Co., Nos. 443 and 445 Broadway, New York. The magnitude of this enterprise may astonish some of our readers. We are told that if all who have begun to purchase the *Cyclopœdia* continue to take all the volumes, the sales will amount to not less than $700,000.

The London *Athenœum* says:—

At the Greenwich dinner, three weeks ago, Mr. Black read the following statistical paragraph respecting the seventh and eighth editions of the *Encyclopœdia Britannica:* Amount paid to contributors and editors, £40,970; cost of paper, £52,503; of printing and stereotyping, £36,708; of engraving and plate-printing, £18,277; of binding, £52,613; of advertising, £11,081; of miscellaneous items, £2,269; making a total cost of £184,421, or about $920,000. Of these two editions, there have been printed above 10,000 copies. These figures indicate the magnitude of this literary enterprise.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

INFALLIBLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

BINDING.—We are prepared to bind volumes, in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers, by mail, 50 cents; by express or delivered at the office, 40 cents.

BACK NUMBERS AND VOLUMES OF THE SCIENTIFIC AMERICAN.—Volumes I., II. and III. (bound or unbound) may be had at this office and from all periodical dealers. Price, bound, $1.50 per volume. by mail, $2—which includes postage. Price in sheets, $1. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application to this office. Address MUNN & CO.,
No. 37 Park-row, New York.

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Notes and Queries

H. A. L., of Mass.—The control, ownership, right of use and sale of a patent, rests exclusively in the patentee until he assigns his right. He can assign the whole or any portion of his right, either before or after the grant of the patent. It appears to us that he who, in a copartnership, offsets his skill against the capital and business talents of his associates, is morally bound to give them the full benefit of any improvements he may make, connected with the company enterprises. The fact that the improvement is of a portable character makes no difference. Indeed, the very first use to which the man of skill should devote his patent ought to be to secure and assist the company just as far as possible. The creditors of an assignor cannot seize a patent from the assignee, provided the assignment was made in good faith.

R. H. J., of Iowa.—The current produced by a magnetic electric machine, when passing through a wire, renders iron magnetic in the same manner as a galvanic battery. The magnetic current is about the same strength in all parts of a short circuit. You cannot gain any power by arranging a number of water-wheels and permitting the water to pass from the one into the other. One good wheel will give out more power than two or more placed one above the other, and all connected together. We think your improvement in sewing machines for regulating the separation of the needles, when several are used, is a new and patentable improvement.

Ledger, of Penn.—Your failure to give us the size of the hose renders it impossible to answer your question categorically. The greater the length of hose, however, the more would the flow of water through it be obstructed; and while it is impossible that the short piece of hose should burst more readily than the long piece, it may be that the size of the hose is so great in proportion to the size of the nozzle, that the latter would obstruct the flow of the water sufficiently to make the length of hose of no consequence.

H. H. S., of Ill.—It takes about 4,000 cubic feet of hydrogen gas in a balloon to support an ordinary man in the air.

J. H. H., of N. Y.—Copper lightning rods are the best in use. Varnishing a lightning rod injures its conducting power.

J. A., of N. Y.—We have never seen a quartz crusher that we liked better than the common stamping mill. This is formed of a series of upright sticks of scantling—say four inches square—armed with chilled cast-iron at the lower end, and raised by cogs upon a revolving shaft.

E. R., of N. Y.—The powder used in the Grimea confined in small tubes, which were broken by attacking parties, and communicated with explosive wires, was the chlorate of potash and fulminating mercury—percussion powder. Common gunpowder and guncotton may be exploded by the electric spark. You can dilute common powder so as to burn as slow as you please, by using common ground charcoal, but its expansive force will be diminished in proportion as it lacks the requisite quantities of sulphur and niter.

G. F. L., of N. Y.—There is no possible way of making a strip of cloth a first-class conductor of heat. Cloth cannot be made perfectly water-proof without the use of india rubber, or some resin or oil varnish, but it will become partially water-proof by boiling it in a solution of alum and sugar of lead, then drying it in a warm apartment. There is no efficient nor useful mode of producing artificial cold without the use of a fluid.

R. S. S., of Conn.—A vacuum is a place devoid of matter. A partial vacuum can be produced in the bell glass of an air pump, but we have never yet witnessed the formation of a perfect vacuum. Bourne's "Catechism of the Steam Engine" will be very useful to you. Steam has been frequently used with success for extinguishing fires on steamboats.

R. W., of N. Y.—Your invention was patented some years ago by A. S. Lyman. Such chambers are called accelerating chambers. A peculiar construction of such chambers is also embraced in the patent of J. W. Cochran, in 1859.

I. L. A., of N. Y.—Steam is superheated by passing it through tubes situated in the smoke-box, or flues, as it flows from the boiler to the cylinder. Wethered Brothers, Baltimore, Md., fit up superheating apparatuses. C. Copeland, engineer, this city, can give you the information desired about the size of tubes, &c.

C. R. and S., of N. H.—We do not know how the opaque parts of skins, for drum-heads, are rendered clear, but perhaps you may improve their appearance by giving a little stronger "sour" of sulphuric acid.

A. C. R., of Boston, Mass.—Sweet oil of almond may be made to unite with water and form an emulsion, by adding a little pearl ash, or acqua ammonia, to the water, and agitating the whole together for ten or fifteen minutes.

W. W. A., of Ind.—In the earlier volumes of the SCIENTIFIC AMERICAN we published meteorological tables, but we found they occupied too much space for the majority of our readers.

W. H., of N. Y.—Upon inquiry of a painter in this city, who has used English varnish for carriages, he stated that he found no difficulty in managing it so as to dry equally, and not in streaks, when he kept it well stirred, and carried on the operation in a warm dry place. Care must be taken that no moisture be allowed on the surface to which varnish is applied, and it should be of a uniform temperature, or it will dry in opaque streaks.

B. D., of Boston, Mass.—Thin black paint is the only indelible black marking fluid, known to us, for application on boxes with a brush. All the common inks wash out with rain. Nitrate of silver in solution is the common indelible ink sold for writing on linen.

A. O. P., of N. Y.—We do not think that a machine for removing the spikes of cannon—if it is complicated—would be of much service to an army. We could form a more correct opinion of such a machine, if we saw it, so as to judge of its construction and operation.

J. W. P., of N. Y.—Professor Vergnes' electro-magnetic machine did not generate its own power. A large galvanic battery was employed to give it motion. The inventor resides in this city.

H. H. G., of Conn.—The subject of centrifugal force is fully discussed in "Morin's Mechanics," translated by Bennet, and published by D. Appleton & Co., of this city. To calculate the force with which any given segment of the ring of a revolving fly-wheel tends to fly away from the center, divide the weight of the segment in pounds by 32, multiply the quotient by the square of the velocity of the ring in feet per second, and the product by the radius in feet; the last product will express the force in pounds.

W. S., of N. Y.—The telescopic sight for rifles, to which you refer, has not been patented in this country. Dick does not describe a telescope, in his "Practical Astronomer" as applied to rifles. It is probable that Dr. Dick never fired a rifle in his life.

J. H., of Pa.—Gas stoves are most useful and convenient apparatus for cooking in summer. They are more cleanly, and we believe more economical, also, than coal stoves. The gas should be mixed with a portion of air, in a separate chamber, prior to admitting into the combustion chamber.

C. S., of Mo.—You are right, "I done" is ungrammatical. You should say "I did," and "I have done." But "the boat was laying at the wharf" is not right; it should be "the boat was lying at the wharf."

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, July 10 1861:—

C. F., of Wis., $15; R. W., of Iowa, $15; W. A. D., of Ill., $15; P F., of Pa., $15; W. H., of Ct., $25; E. H., of Maine, $25; C. M. S., of Ct., $550; L. B. L., of Cal., $30; J. A. A., of Ct., $25; B. and C., of N. Y., $15; H. H. W., of Cal., $50; H. C., of Cal., $35; J. H. M., of Mich., $25; W. M., of Mass., $15; A. S. L., of N. Y., $20; B. A. M., of Ct., $10; T. B. R., of Ill., $25; C. F. L., of Pa., $15; W. M. M., of Ill., $20; S. M. D., of Mass., $5; E and B., of Vt., $15; P. J. B., of N. S., $15; J. N. D., of N. Y., $25; R. G. T., of Mass., $15; W. B., of N. Y., $15; A. J. S., of Iowa, $22; L. A., of Mass., $15; J. E. S., of N. Y., $40; W. L. G., of N. Y., $15; G. J., of N. Y., $15; P. F., of Austria, $30; P. C., of N. Y., $25; L. and W., of N. Y., $5; F. J. B., of Wis., $25; C. A., of N. Y., $12; G. D. H., of Ill., $25; C. F. B., of R. I., $20; E. T. de V., of N. Y., $15; W. H., of N. Y., $22; G. G. G., of Ct., $45; A B., of N. Y., $20; H. T. C., of Ct., $20; J. and M., of N. Y., $20; M. G. C., of N. Y., $20; W. P., of N. Y., $20; W. and L., of N. Y., $20; G. S. R., of N. Y., $20; W. H., of N. Y., $20; I. P. I., of Min., $20; W. and S., of Ohio, $25; E. F. H., of N. Y., $25; W. and L., of N. Y., $25; G. S. R., of Vt., $25; S. M. D., of Mass., $25; A. C. C., of R. I., $15; W. H. B., of Ct., $25; W. L. W., of Mass., $25; C. R. S., of Vt., $25; G. G. G., of Ct., $25.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from July 3 to Wednesday, July 10, 1861:—

S. M., of Mass.; J. C. G., of Mass.; E. H., of Maine; T. B. R., of Ill.; J. A. A., of Conn.; W. M. M., of Ill.; W. E., of N. Y.; J. H. M., of Mich.; A. R. D., of N. Y.; H. C., of Cal.; C. N., of N. H.; C. T., of N. Y.; R. B., of Iowa; A. J. S., of Iowa; C. C., of Pa.; E. G., of Maine; R. R. P., of Mass.; A. P., of Conn.; R. D., of N. Y.

New Books and Periodicals Received.

The *American Railway Review* has just commenced its fifth volume. It is an able weekly, devoted to railway finances, engineering and public works. It occupies a position in disseminating information respecting railways which is creditable to its publishers and editor. It generally discusses questions relating to railways with impartiality, and in a very intelligent manner. It appears to be an indispensable companion for all who are particularly interested in railways.

INSTRUCTIONS ABOUT EUROPEAN PATENTS, With a Synopsis of the Patent Laws of the Various Countries.

AMERICAN INVENTORS SHOULD BEAR IN MIND that, as a general rule, any invention which is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Four patents—American, English, French and Belgian—will secure an inventor exclusive monopoly to his discovery among 100,000,000 of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The majority of all patents taken out by Americans in foreign countries are obtained through the Scientific American Patent Agency. We have established agencies at all the principal European seats of government, and obtain patents in Great Britain, France, Belgium, Prussia, Austria, Spain, &c., with promptness and dispatch.

It is generally much better to apply for foreign patents simultaneously with the application here; or, if this cannot be conveniently done, as little time as possible should be lost after the patent is issued, as the laws in some foreign countries allow patents to any one who first makes the application, and in this way many inventors are deprived of valid patents for their own inventions.

Many valuable inventions are yearly introduced into Europe from the United State, by parties ever on the alert to pick up whatever they can lay their hands upon which may seem useful.

Models are not required in any European country, but the utmost care and experience is necessary in the preparation of each case.

GREAT BRITAIN.

Patents for inventions under the new law, as amended by the act of Oct. 1, 1852, and now in operation, include the United Kingdom of Great Britain and Ireland in one grant, which confers the exclusive right to make, use, exercise or vend. This is conceded to the inventor, or the introducer, for a period of fourteen years, subject, after the patent is granted, and the first expenses paid, to a government tax twice during its existence—once within three years, and once again within seven. The purchaser of a patent would assume the payment of these taxes.

There is no provision in the English law requiring that a patented invention shall be introduced into public use within any specified limit. Under the Patent Act of October, 1852, the British government relinquished its right to grant patents for any of its colonies, each colony being permitted to regulate its own patent system. If a patent has been previously taken out in a foreign country, the British patent will expire with it.

FRANCE.

Patents in France are granted for a term of fifteen years, unless the invention has been previously secured by patent in some other country; in such case, it must take date with and expire with the previous patent. After the patent is issued, the French government requires the payment of a small tax each year so long as the patent is kept alive, and two years' time is given to put the invention patented into practice.

It should be borne in mind that, although the French law does not require that the applicant should make oath to his papers, yet if a patent should be obtained by any other person than the inventor, upon proof being adduced to this effect before the proper tribunal, the patent would be declared filegal.

BELGIUM.

Patents in Belgium are granted for twenty years, or if previously patented in another country, they expire with the date thereof. The working of the invention must take place within one year from date of patent; but an extension for an additional year may be obtained on application to the proper authorities. Inventors are only legally entitled to take out patents.

THE NETHERLANDS.

Patents are granted by the Royal Institute of the Netherlands to natives or foreigners represented by a resident subject, which extend to a period of about two years, within which time the invention must be brought into use, and upon payment of an additional tax, a patent will be granted to complete its whole term of fifteen years. Unless these conditions are complied with, the patent ceases.

PRUSSIA.

Applications for patents in Prussia are examined by the Royal Polytechnic Commission, and unless there is novelty in the invention, the applicant's petition will be denied; and if it is granted, the invention must be worked within six months afterward. A respite, however, of six additional months may be obtained, if good and sufficient reasons for it can be shown.

AUSTRIA.

Austrian patents are granted for a term of fifteen years, upon the payment of 1,000 florins, or about $500 in American currency. This sum, however, is not all required to be paid in advance. It is usual to pay the tax for the first five years upon the deposit of the papers, and the patent must be worked within its first year. The Emperor can extend the patent and privilege of working by special grant. In order to obtain a patent in Austria, an authenticated copy of the original Letters Patent must be produced.

SPAIN.

The duration of a Spanish patent of importation is five years, and can be prolonged to ten years; and the invention is to be worked within one year and one day.

To obtain a Cuban patent requires a special application and an extra charge.

RUSSIA.

Since the close of the Crimean war, considerable attention has been given to Russian patents by Americans. Russia is a country rich in mineral and agricultural products, and there seems to be a field open for certain kinds of improvements. The present Emperor is very liberally disposed toward inventors, and as an evidence of the interest which he takes in the progress of mechanic arts, we may state that we have had visits from two distinguished Russian *savans*, specially sent out by the Emperor to examine Amdrican inventions. As Russian patents are expensive, and somewhat difficult to obtain, we do not take it upon ourselves to advise applications; inventors must judge for themselves; and this remark applies not only to Russia, but also to all other foreign countries.

CANADA.

Patents of invention are granted only to actual residents of Canada and British subjects. Under the general Patent Law of Canada, an American cannot procure a patent for his invention there. The only way in which he can do so is by virtue of a special act of Parliament, which is very difficult, uncertain, and expensive to obtain. Several zealous friends of reform in Canada are working earnestly to bring about a reciprocal law, but their efforts have thus far proved fruitless.

BRITISH INDIA.

The date of the law, Feb. 28, 1856; duration of a patent, fourteen years. Invention must be worked within two years from date of petition. Privilege granted only to the original inventor or his authorized agent in India.

SAXONY.

Duration of patent, from five to ten years. Invention must be worked within one year from date of grant. Careful examination made before granting a patent.

HANOVER.

Duration of patent, ten years; and in case of foreign patent having been previously obtained, an authenticated copy of said patent must be produced. Invention must be worked within six months from date of grant.

SARDINIA.

Duration of patent, from one to fifteen years. Patents for five years or less must be worked within one year, and all others within two years.

NORWAY AND SWEDEN.

Duration of patent, three years, at least; fifteen at most, according to the nature and importance of the invention. Patents for foreign inventions not to exceed the term granted abroad, and to be worked within one, two or four years.

AUSTRALIA.

Date of law, March 31, 1854. Careful examination made by competent persons previous to issue of patent, which, when granted, extends to fourteen years. Imported inventions are valid according to duration of foreign patent. It would require from twelve to eighteen months to procure a patent from the Australian government.

Parties holding foreign patents secured through our agency will be notified from time to time of the condition of their cases.

GENERAL REMARKS.

While it is true of most of the European countries herein specified, that the system of examination is not so rigid as that practised in this country, yet it is vastly important that inventors should have their papers prepared only by the most competent solicitors, in order that they may stand the test of a searching legal examination; as it is a common practice when a patentee finds a purchaser for his invention for the latter to cause such examination to be made before he will accept the title.

It is also very unsafe to entrust a useful invention to any other than a solicitor of known integrity and ability. Inventors should beware of speculators, whether in the guise of patent agents or patent brokers, as they cannot ordinarily be trusted with valuable inventions.

Messrs. MUNN & CO. have been established *fifteen years* as American and Foreign Patent Attorneys and publishers of the SCIENTIFIC AMERICAN, and during this time they have been entrusted with some of the most important inventions of the age; and it is a matter of pardonable pride in them to state that not a single case can be adduced in which they have ever betrayed the important trust committed to their care. Their agents in London, Paris, and other Continental cities, are among the oldest and most reliable Patent Solicitors in Europe, and they will have no connection with any other.

CAUTION.—It has become a somewhat common practice for agents located in England to send out circulars soliciting the patronage of American inventors. We caution the latter against heeding such applications, or they may otherwise fall into the hands of irresponsible parties, and thus be defrauded of their rights. It is much safer for inventors to entrust their cases to the care of a competent, reliable agent at home.

FEES.—The fees required by us for the preparation of foreign applications are not the same in every case; as, in some instances, when the inventions are of a complicated character, we are obliged to charge a higher fee. Applicants can always depend, however, upon our best terms, and can learn all particulars upon application, either in person or by letter.

Parties desiring to procure patents in Europe can correspond with the undersigned, and obtain all the necessary advice and information respecting the expenses of obtaining foreign patents.

All letters should be addressed o Messrs. MUNN & CO., No. 37 Park-row, New York.

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CHANGE IN THE PATENT LAWS.

NEW ARRANGEMENTS---PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws, recently enacted by Congress, are now in full force, and promise to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
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On application for Re-issue	$30
On application for Extension of Patent	$50
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On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN ; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees, at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

Testimonials.

The annexed letters, from the last three Commissioner of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

MESSRS. MUNN & Co. :—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent, c., made up and mailed to the Inventor, with a pamphlet, giving in structions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed, for the Patent Office. These should be securely packed, the Inventor's name marked on them, and sent, with the government fee, by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but ttle risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO. No. 37 Park-row New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Interferences.

We offer our services to examine witnesses in cases of interference, o prepare arguments, and appear before the Commissioner of Patents or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "*Hints to Inventors.*" Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited For rther particulars, address MUNN & CO., No. 37 Park-row, New York .

Extension of Patents.

Valuable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

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Thirty Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement sent for publication.

ILLINOIS STATE FAIR—TO BE HELD AT CHICAGO, Sept. 9th to the 14th; regular premium list, $22,000. Messrs. Garrison & Co. will receive and put upon exhibition, and procure premiums for (if possible), articles from parties at a distance. They will also negotiate sales of rights, &c., &c. Parties will here have their articles brought before the notice of 100,000 people. Charges, from $8 to $12; best of reference given. Address GARRISON & CO., No. 126 Randolph street, Chicago, Ill.; P. O. Box, No. 3,871. 1*

C. C. HOFF'S PATENT IMPROVED DEODERIZED Mastic Roofing—Patented May 14, 1861. This Roofing is carefully put up and shipped to any part of the United States, with full printed directions for use. It is adapted to steep or flat roofs; is fireproof. State and county rights for sale. Address the inventor and proprietor, C. C. HOFF, Poughkeepsie, N. Y. 3 4*

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AMESSIEURS LES INVENTEURS—AVIS IMPORtant. Les Inventeurs non familiers avec la langue Anglaise et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO.

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TO MILLERS.—THE UNDERSIGNED OFFER AT A bargain the Valley Flouring Mill, located at Little Falls, Herkimer county, N. Y. It contains three runs of Stones, with water-power for five more, and is situated in the heart of the great dairying district, thus making a home trade for all the flour and feed the mill can grind; capacity, 100 barrels per day. It is within 200 feet of either railroad or canal, and is without doubt the finest location in the State for a safe milling business. A portion of the purchase can remain on bond and mortgage. A. RATHBUN & CO.,
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SWISS DRAWING INSTRUMENTS.—CATALOGUE (7TH edition), containing over 250 illustrations of Mathematical, Optical and Philosophical Instruments, with attachment of a large sheet representing the genuine Swiss Instruments, in their actual size and shape, will be delivered on application to all parts of the United States (gratis), by C. T. AMSLER, No. 635 Chestnut-street, Philadelphia, Pa., established agency for the Swiss Drawing Instruments since 1848.

Being about to retire from business, I have sold my stock of Swiss Mathematical Instruments to Messrs. McALLISTER & BROTHER, of No. 728 Chestnut street, Philadelphia, who will continue to keep such for sale, and to whom I refer my former friends and customers.
C. T. AMSLER.
Philadelphia, Pa., June 12, 1861. 1 tf

RARE CHANCE.—C. T. AMSLER, OPTICIAN, NO. 635 Chestnut-street, Philadelphia, is offering from the 1st of June his large stock of Mathematical, Optical and Philosophical Instruments at 20 per cent below the regular retail prices; Drawing Instruments and Magic Lanterns, Photograph of War Scenes, &c., are sold at the same rate. 25 4*

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Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

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Improvement in Slate Roofing.

The many advantages combined by slate, as a material for roofing, makes it infinitely superior to the various substitutes now in general use. The ordinary method of laying it has, however, confined its use to steep roofs, and has been attended with serious disadvantages, the principal of which are, the breaking and splitting of the slate in winter caused by the formation of ice in the interstices, and the liability of the slate being loosened and blown away in stormy weather.

The idea of laying slate without lapping, and upon flat roofs, or those with a moderate pitch, has occurred to the minds of many men, and efforts have been made to put the idea into practice, but the difficulties in the way have not hitherto been fully surmounted.

Slate has been laid without lapping the slabs, in cement, forming water-tight joints, but inelastic or unyielding, and consequently, on the sagging or settling of the roof, which soon occurs, the joints crack or batter the cement, causing the roof to leak.

We now, however, have the satisfaction of illustrating an important improvement in slate roofing, by which all these difficulties are practically obviated. The slabs, A, which are not necessarily limited to any particular size or thickness, are dressed with parallel sides and ends, the edges being beveled at the top and bottom, and a hole drilled through the center of each, which is countersunk so as to allow the insertion of a screw, for the purpose of fastening them to the roofing plank. The slabs are connected together by elastic joints, formed of materials that will yield to the sagging of the roof, without rendering it any the less water-proof. The lower parts of these joints are made of strips of vulcanized india rubber, C, which are introduced between the slabs and made to adhere to the edges of the slate by a solution of rubber. The remaining space above the rubber is filled with an indissoluble cement, D, and coated with sand, which finishes the joint.

The cement does not destroy the elasticity of the joint, and is designed to protect the rubber from the effects of the weather. The heads of the screws, which sink far enough into the countersinks of the slabs to permit of it, are also protected by a coating of the cement. The roofing planks or strips upon which the slates are to be laid may be separated, as shown in the engraving, one fourth the width of the slate, thereby saving one half the lumber ordinarily used.

The materials of which this roof is formed, taken in connection with the method of laying it, afford a sufficient guarantee of its durability.

It is believed by men most familiar with vulcanized india rubber, that it will last in the joints of this roof, protected in the manner which it is, as long as the slate. A roof of this description does not stand in constant need of painting and repairing to preserve it and keep it water-proof, as is the case with all kinds of metal roofs. It seems to us that when its merits are fully known, it must come into general use where slate can be obtained, and prove a rich prize to the inventor.

This valuable invention is protected by two patents secured through the Scientific American Patent Agency —one dated February 26, and the second, May 21, 1861, and parties wishing to obtain further and more particular information in relation it can do so by calling upon or addressing the patentee, J. S. Sammons, 229 Broadway (New York Central R. R. office), New York.

The inventor of this roofing has also produced an ingenious machine for dressing the slate, which will be noticed in a future number of this paper.

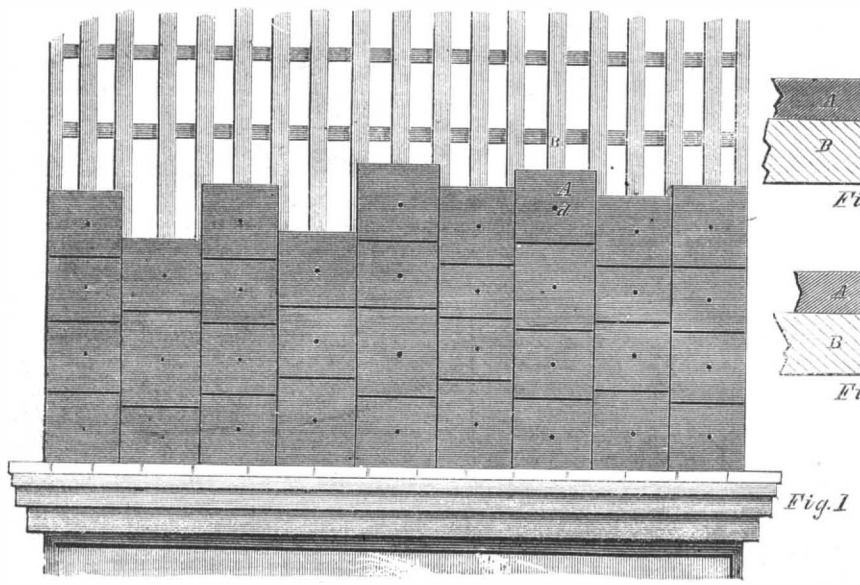


Fig. 2

Fig. 3

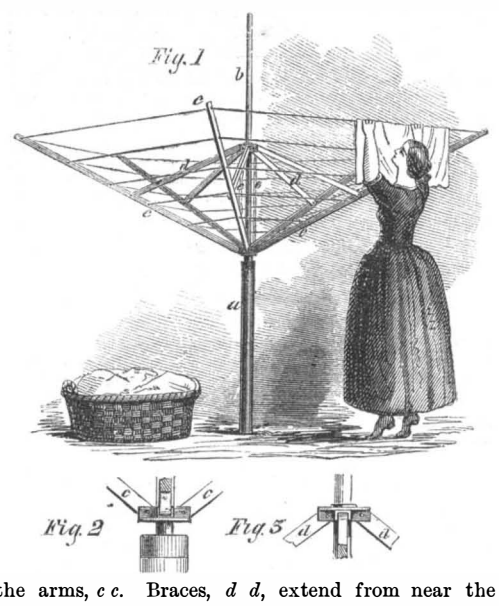
Fig. 1

SAMMONS' ELASTIC JOINT SLATE ROOF.

ALLEN'S CLOTHES DRYER.

Of all the clothes dryers that have been invented, the one here illustrated is one of the simplest, most compact and most convenient. A post is set firmly in the ground, and four or more arms extend from it at an inclination upward; between these arms are stretched the lines on which the clothes are hung. This invention relates to improvements in the mode of arranging and bracing the several parts.

In the cut, Fig. 1 is a perspective view of the apparatus, and the other figures represent some of the parts on a larger scale. The post, *a*, is set sufficiently deep in the ground to stand firmly, and the smaller shaft, *b*, is inserted into its upper end so as to form a shoulder at the junction. A collar, with projecting ears as represented in Fig. 2, rests upon the shoulder of the post, surrounding the shaft, *b*, and supporting



the arms, *c c*. Braces, *d d*, extend from near the middle of the arms, *c c*, to a second collar surrounding the shaft, *b*, represented in Fig. 2. Lines, *e e*, connect the two collars, and by tightening these lines so as to draw the two collars together, the arms, *c c*, are pressed outward, and the lines connecting them are stretched taut.

As the whole fabric of arms and braces turns freely around the central post, steps may be placed at one side of the apparatus, and the clothes hung upon the lines without the hard work of reaching upwards with heavy sheets, which is ordinarily so fatiguing. As the frame is blown around by the wind, this motion also hastens the drying of the clothes.

We have had this dryer in use in our families for some time, and it gives the most perfect satisfaction.

The patent for this invention was granted, through the Scientific American Patent Agency, Sept. 11, 1860, and further information in relation to it may be obtained by addressing the inventor, O. P. Allen, at Rindge, N. H.

To Keep Butter Sweet.—D. E. Smith contributes to the *American Agriculturist* the following directions for preserving butter in good condition for any length of time :—"In May or June when butter is plenty, work it thoroughly two or three times, and add at the last working nearly one grain of saltpeter and a tablespoonful of pulverized loaf sugar to each pound of butter. Pack it tightly in stone jars to within two inches of the top, and fill the remaining space with strong brine. Cover the jars tightly, and bury them in the cellar bottom, where the butter will keep unhurt for a long time."

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The SCIENTIFIC AMERICAN is indispensable to every inventor, as it not only contains illustrated descriptions of nearly all the best inventions as they come out, but each number contains an Official List of the Claims of all the Patents issued from the United States Patent Office during the week previous; thus giving a correct history of the progress of inventions in this country. We are also receiving, every week the best scientific journals of Great Britain, France, and Germany; thus placing in our possession all that is transpiring in mechanical science and art in these old countries. We shall continue to transfer to our columns copious extracts from these journals of whatever we may deem of interest to our readers.

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No person engaged in any of the mechanical pursuits should think of "doing without" the Scientific American. It costs but four cents per week; every number contains from six to ten engravings of new machines and inventions, which cannot be found in any other publication It is an established rule of the publishers to insert none but original engravings, and those of the first-class in the art, drawn and engraved by experienced persons under their own supervision.

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